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# Accounting Reviews

**A Neglected Area of Accounting Valuation**  
WARNER H. HORD

**A Suggestion for the Measurement of Solvency**  
I. M. MACKLER

**Accounting for Intangible Assets**  
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**Independent Municipal Auditing**  
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**Cost Analysis of a Cost-plus Contract**  
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**Earning-Power Valuation of Inventory**  
LAWRENCE L. VANCE

**Some Problems of Last-in-first-out Accounting**  
ALBION R. DAVIS

OCTOBER

1943

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# The Accounting Review

VOL. XVII

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## A NEGLECTED AREA OF ACCOUNTING VALUATION

WARNER H. HORD

A BUSINESS unit is one of the thousands of temporary storage tanks through which capital flows in the circulatory system by which it gives economic life to the nation. If the intake and the outgo for each of these separate tanks can be accurately measured, it then becomes possible to determine for each separate business unit its total operating revenue, its total operating costs, its net profit or loss, and the total unexpended resources at rest within its own confines—the capital storage tank of the economic circulatory system. To make such accurate measurement possible, some set of principles had to be developed by which to gage the quantitative flow of this capital and, then, a system of mechanics established by which these principles could be put into operation.

This set of principles by which to measure the flow of capital to and from an individual business unit, we call principles of accounting; the mechanics of operation, we call bookkeeping. Errors in accounting valuation, therefore, may result from (1) errors in the accounting principles, and (2) errors in the bookkeeping mechanics through which these accounting principles operate. Though these two classes of errors may be taken as all-inclusive, they nevertheless present many complications in practical use because of the extreme difficulty of classifying all matters between these two divisions. Hence, a third division

or classification appears necessary—errors in accounting valuation resulting from a confusion of the basic accounting principles with the bookkeeping mechanics through which these principles are operated.

### ACCOUNTING PRINCIPLES UNDERLYING BOOKKEEPING MECHANICS

The current flood of literature and the numerous disagreements and contradictions with respect to what are accounting principles make one hesitate to attempt another such statement and suspicious of the reception such as attempt may receive. But let it be quickly added that this is no attempt at a statement of accounting principles outside the operation of bookkeeping mechanics, where opinions are unrestricted by tangible and constant routines. This article will deal only with a skeleton outline of what the author believes to be the more basic accounting principles underlying and, therefore, controlling the operation of the bookkeeping mechanics as a means of discovering and analyzing what appear to be the causes for the existence of a neglected area of accounting valuation.

By way of emphasizing the importance of this approach, however, it is the opinion of the writer that faster and perhaps sounder progress could be made in the development of a statement of accounting principles if there were a more general

recognition of an intimate relationship between accounting principles and the bookkeeping routines through which such principles operate in practice. If the principles underlying the bookkeeping routines could first be established and accepted, it would then be entirely possible that both the need for and the means of developing additional accounting principles outside the bookkeeping routines would be immeasurably clarified. The elevation of the importance of the bookkeeping routines cannot reasonably demote the importance of accounting principles nor the prestige of the profession which these principles support. The elaborate search at the present time for a satisfactory statement of accounting principles is, in fact, a search for an acceptable routine through which to identify and apply these principles. One is sometimes forced to believe that there is a most unfortunate intermixing of principles with routines in both concepts and formulated statements, and that this tendency to treat the two as one adds much to current-day confusion with respect to what are accounting principles.

Yet it appears evident that both are necessary to the operation of a science of accountancy. Accounting principles without tangible mechanics of operation are likely to be similar to the principles of navigation without the instruments, the principles of statistics without charts and graphs, the principles of mathematics without figures and symbols. Free any science of the mechanics which control and hold human opinions constant and subject to analysis, and you have stripped the science of the only thing that enables it to be a science in spite of the fact that its principles would still exist and would still be as infallible as before. Though they still exist they are not demonstrable. Principles that cannot be proved cannot become generally accepted. It would appear, therefore, that the quality of demonstrability is

a prerequisite to the condition of general acceptability. But demonstration requires the use of mechanics and, in fact, there is every reason to believe that the application of any principle requires the use of mechanics. If these findings have any basis in fact, it should, at least, prove interesting to examine the bookkeeping mechanics for evidences of the accounting principles by which they are controlled.

The accounting principles underlying the operation of bookkeeping mechanics appear to consist of four major propositions and six resulting corollaries. They may be stated as follows:

- I. Major propositions of accounting principles underlying the operation of bookkeeping mechanics.
  - A. That the business entity and the ownership entities of business properties shall be separate and distinct.
  - B. That there shall be a dual classification of the business properties in terms of,
    1. The kinds of things composing such properties.
    2. The kinds of ownership claims attaching to these properties.
  - C. That the amounts assigned to each of the dual classifications of a property shall be of identical origin and therefore equal.
  - D. That the carrying amount of each property be set by the transaction price by which such property was admitted to the business entity.
- II. Corollaries resulting from major propositions of accounting principles underlying the operation of bookkeeping mechanics.
  - A. That business entity ownership in its own business properties shall be nonexistent in accounting concepts as applied to the accounting unit reporting for said business entity.
  - B. That the business entity shall be in the position of a trustee with respect to all business properties under its jurisdiction as a result of which it may engage in transactions with the owners of such properties the same as with nonowners.
  - C. That a transaction basis shall thus be established for all properties entering, leaving, and at rest within the business entity.

- D. That every business transaction involves a property consisting of equated asset and equity elements based on a price of identical origin.
- E. That this principle of equated asset and equity elements provides a basis for double entry bookkeeping mechanics consisting of equal debits and credits.
- F. That such principles are universally applicable to all business ventures without regard to the form of business organization.

#### THE ACCOUNTING CONCEPT OF PROPERTY

The scope of this article will not permit an exhaustive discussion of all the basic accounting principles underlying the mechanics of bookkeeping as outlined above. It is believed that the basic relationships in most cases are virtually self-evident and, for the most part, quite generally accepted. It is the failure to apply these relationships in actual practice that constitutes the chief offense, if offense there be, of current accounting practice.

Double entry is based upon the concept of duality of a single business property. This duality is created through the separation of business properties from their actual owners by placing these properties in the possession of a fictitious business entity which holds and operates such properties under an assumed trust arrangement between the business entity and the legal owners. This is purely an accounting assumption and has no legal basis whatever. Because of this separation of the properties from the legal owners and because of the varying legal status of these owners, it becomes necessary for the fictitious business entity to account both for the kinds of goods or things making up the property in its possession and for the kinds of ownership claims attaching to these goods. Since the properties are held in common for all the different owners so that there can be no identification of particular ownership claims with particular goods or things on hand, the reporting must be done

as if the entire business properties constituted one great fund for which an accounting must be made to a group of owners with distinguishable ownership claims but with goods wholly unascertained in so far as the incidence of these ownership claims is concerned.

Double-entry accounting is, therefore, based upon a dual reporting by different analysis and composition of a group of business properties wholly indistinguishable by legal owners. Its practicality as an instrument for applying accounting principles depends upon the assumption of a singular property as between assets and equities. As a result, the accounting concepts of "asset" and "equity" essentially describe different aspects of a single business property. Hence, these concepts may properly be designated as different elements of a single property. Thus, subsequently, in this paper, the term property will imply an asset element and an equity element of equal amount and of identical origin while the dual aspects of this property will be described as the "asset element" and the "equity element" of the property in question. It is only by reason of an assumed singular property with a dual composition consisting of asset and equity elements that the accounting principle of identical origin can assure the equality of assets and equities through the operation of the double-entry system of accountancy.

#### THE OPERATION OF THE PRINCIPLE OF EQUATED ASSET AND EQUITY ELEMENTS

Through the operation of this principle of a dual composition of all business properties, property in the dual or double-entry sense is made the subject matter of every business transaction. The double-entry system of accountancy requires a double description of all the business properties entering into executed business

transactions, but by different analysis and composition. Since each separate description embraces the whole of the business properties but by different composition and since the amounts of each are set by prices in identical transactions, it follows that the total amount of the asset elements must be equal to the total amount of the equity elements.

This equality of asset and equity elements is not assured by the equality of bookkeeping debits and credits alone. It can result only if the equal debits and credits are so recorded as to equate the asset and equity elements of each property subject matter entering and leaving the business entity. At first glance these two statements may appear to be of identical meaning but analysis, it is believed, will reveal a radical difference between the equality of amounts in disregard of the underlying substance and the equality of amounts as determined by the underlying substance of the business properties. The first—the equality of debits and credits—describes a rule of bookkeeping procedure; the second—the equality of asset and equity property elements—describes a principle of accounting control basic to all accounting valuation.

A simple illustration will give a sufficiently adequate distinction between the two for our present purposes. Suppose a machine which cost \$5,000 and with a current book value of \$2,000 is sold for \$1,000, what would be the correct entry in terms of equated asset and equity property elements? Analysis will show that of the \$5,000 of original cost \$3,000 has already been converted to other forms of property by other transactions. The asset element of that property is therefore carried on the books currently at \$2,000. But by the principle of equated asset and equity elements the equity composition of the same property is likewise carried on the books at \$2,000. Since only the net-

worth equities may respond to a sales transaction, the proper entry for removing this property from the books of account would be:

Net worth.....	\$2,000	
Reserve for depreciation.....	3,000	
Machinery.....		\$5,000

The entry for recording the receipt of the new property, cash, would be:

Cash.....	\$1,000	
Net worth.....		\$1,000

Obviously a shortcut combination entry might be made as follows:

Cash.....	\$1,000	
Reserve for depreciation.....	3,000	
Net worth.....	1,000	
Machinery.....		\$5,000

It is not likely that the correctness of these entries would be seriously questioned. Yet their correctness is not controlled by equal debits and credits, but rather by the accounting principle of equated asset and equity property elements. The original cost price less subsequent amortizations was the amount of identical origin applying alike to the asset and the equity elements of this property by which to determine its present carrying basis on the books of account. That this control was not exerted by the bookkeeping rule of equal debits and credits may be demonstrated from the fact that any number of entries consisting of equal debits and credits could be devised by which to record the above transaction. The following are illustrative:

1. Cash.....	\$1,000	
Machinery.....		\$1,000
2. Reserve for depreciation...	3,000	
Cash.....	1,000	
Machinery.....		\$4,000
3. Cash.....	\$1,000	
Goodwill (other assets)...	1,000	
Reserve for depreciation...	3,000	
Machinery.....		\$5,000

Other entries could be devised which



would satisfy the bookkeeping rule of equal debits and credits but it will probably be universally agreed that neither of the above entries produces the correct accounting effect. The accounting effect, it must therefore be admitted, is wholly independent of the operation of the bookkeeping rule of equal debits and credits. Hence, there must be an accounting principle by which the bookkeeping rule may be controlled in such a way as to produce the correct effect as between the accounting asset and equity property elements through the recording of equal debits and credits. This principle may be stated as follows: *That the carrying basis of every property entering the business entity be established by equating its asset and equity elements in terms of the transaction price by which such property was acquired; and, that the amount at which to remove every property leaving the business entity be established by equating its asset and equity elements in terms of the carrying basis of the property element identified in the transaction by which such property is discharged.* Wherever this principle fails to control the amounts of the debits and credits recorded by bookkeeping procedures there must be errors in accounting valuation. At the present time, not only does this principle fail to operate in a broad group of so-called equity transactions but, in these particular cases, its correct application is definitely contrary to generally accepted accounting principles. It is this group of transactions which defines the limits of the neglected area of accounting valuation which will now be discussed in some detail.

#### THE NEGLECTED AREA OF ACCOUNTING VALUATION

The operation of the accounting principle of equated asset and equity property elements to transactions in which identified equity elements are the property subject matter can best be explained by

illustration. Assume an accounting equity with a current carrying basis of \$500 is retired for a cash price of \$400.

According to the accounting principle of equated asset and equity property elements, the \$500 equity in question is but one of two equal elements of a single business property whose current carrying basis in both its asset and its equity compositions is \$500. The retirement of an equity element whose current carrying basis of \$500 must, therefore, require the simultaneous retirement of an asset element of corresponding amount. Any other assumption nullifies the principle of equated asset and equity property elements of identical carrying amount in the determination of the property subject matter of a business transaction. It is equally evident that if this principle does not hold true in cases of identified equity elements, then it cannot hold true with respect to identified asset elements. Invalidate this principle and there remains only the bookkeeping rule of equal debits and credits to control the recording process. This rule has already been demonstrated to be false.

If the accounting principle of equated asset and equity property elements is assumed to control the bookkeeping mechanics, the entry to record the discharge of the outgoing property in the above transaction at its current carrying basis would be:

Specified equities.....	\$500
Unspecified (or composite) assets.....	\$500

The entry to record the admission of the incoming property at its current transaction price would be:

Unspecified (or composite) assets..	\$400
Cash.....	\$400

It is evident that a combination short-cut entry might be made as follows:

Specified equities.....	\$500
Cash.....	\$400



Unspecified (or composite) assets.....	100
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It is apparent that the net effect of either of the above procedures is to reduce the carrying basis of both the asset and the equity elements by exactly the same amount—\$500. It is significant to note, at this point, that if an identified asset property element with a current carrying basis of \$500 had been disposed of for \$400 in cash, the application of the accounting principle of equated asset and equity elements would produce exactly similar results.

The entry to record the discharge of the outgoing property would be:

Net worth.....	\$500
Assets.....	\$500

The entry to record the admission of the incoming property would be:

Cash (assets).....	\$400
Net worth.....	\$400

The above two entries may be combined into the following short-cut entry:

Cash.....	\$400
Net worth.....	100
Assets.....	\$500

It should now be apparent that the operation of the accounting principle of equated asset and equity property elements leads directly to a conclusion which is consistent alike for transactions dealing in identified equity elements and for those dealing in identified asset elements. This conclusion may be stated in terms of the bookkeeping mechanics as follows: Any difference between the current carrying basis of an identified asset element and the price at which it is retired should be carried to the appropriate equity accounts; similarly, any difference between the current carrying basis of an identified equity element and the price at which it is retired should be carried to the appropriate asset accounts.

This procedure is in sharp contrast with current practice. According to current practice, the retirement of the above equity with a current carrying basis of \$500 for a cash price of \$400 would be recorded as follows:

Specified equities.....	\$500
Cash.....	\$400
Specified equities.....	100

This entry, of course, would be short cut as follows:

Specified equities.....	\$400
Cash.....	\$400

It is evident that both of these entries leave an equality between asset and equity accounts but it has done so by disregarding the actual property substance underlying these amounts. The entries result in the retirement of a property of only \$400 while the carrying basis of the property was positively identified as \$500. Though the \$100 difference has, in fact, been retired from the business entity, it still remains in the accounts which describe the properties at rest within the business entity. This effect was produced by refusing to remove the asset element to the extent of \$100 while forcing a balance by transferring \$100 of the carrying amount of the retired equity element to other equity elements still at rest within the business entity. This transfer, presumably, is some fictitious type of gift, but it is a gift to which there is neither substance, intent, nor active parties.<sup>1</sup> The actual facts are that both the assets and equities of the business properties, as now described by the books of account, contain an amount of \$100 which is purely fictitious in terms of actual cost.

It is interesting to note the effects produced by applying a similar procedure to

<sup>1</sup> C. H. Rankin, "Treasury Stock: A Source of Profit or Loss?" *ACCOUNTING REVIEW*, March, 1940. Mr. Rankin believes that any excess of book value over purchase price "should be credited to surplus as a donation by the retiring shareholder," while the reverse situation should be treated as an additional distribution to the shareholders.

transactions involving identified asset property elements. The corresponding treatment from the point of view of an identified asset element would give the following result:

Cash.....	\$400	
Assets (other).....	100	
Assets (retired).....		\$500

A simpler statement of the entry in terms of its net effects on assets would be:

Cash.....	\$400	
Assets.....		\$400

The effect of this procedure would be to offset the difference between the carrying basis of the asset element retired and the price received against another asset rather than carrying this difference to an equity. This, of course, would fail to clear the accounts of the full carrying basis of the retired asset and would, therefore, be considered one of the worst of accounting sins. There is, however, exactly the same logic to support this type of entry as there is to support the generally accepted practice of transferring the difference between the carrying amount of an equity and the price at which it is retired to another equity. This procedure, likewise, fails to clear the accounts of the full carrying basis of the equity retired, but it is considered correct accounting practice. It should be evident that current market price should have nothing to do with the determination of the carrying basis at which the old property is to be removed from the books of account. There is no basis in logic for a greater degree of interdependence among the equities than among the assets. It is just as reasonable to assume that one asset can be increased by selling another asset at a loss as to assume that one equity can be increased by retiring another equity at a price less than its carrying basis. Neither is it logical nor true to fact to assume on the one hand that transaction price is the best attainable measure of

value and yet argue that, in the case of the retirement of equities, such market price is not a fair measure of value thus necessitating a compensating element of gift to balance the books. The assumption of a gift in connection with a competitive transaction executed in a free and active market at the generally prevailing price level is a very unimpressive reason to support an accounting practice no matter how generally accepted such practice may be. A better practice, and the one followed in other areas of accounting practice, would be to accept transaction price unless the evidence of collusion is so overwhelming as to destroy its validity beyond doubt.

#### PRINCIPLES OF DOUBLE-ENTRY ACCOUNTING VALUATION

The above analysis has consisted very largely of an application of the accounting principle of equated asset and equity property elements in defense of the propositions thus far advanced. The same conclusions, however, may be reached by other processes of logic. First let us analyze an equity retirement transaction. It is the exact opposite of an investment transaction and thus is a partial dissolution of the business enterprise. If the entire business properties were composed wholly of fungible goods, the dissolution transaction could be executed by an actual division of the asset elements of the property so that an entire property of any stated amount could be immediately identified in both its asset and equity aspects. Under such circumstances there would be no necessity for a price settlement since the exact equivalent in property to the equity owner's interest in the business could be identified and distributed to the retiring owner, thus retiring his interest at its exact carrying amount on the books of account.

Under other and more common conditions the property of a business entity

would not consist of a mass of virtually identical units of goods of equivalent values that would permit of an actual division of the properties in accordance with ownership interests. Thus the common procedure for dividing property in a price economy must be that of determining the market price and settling in cash. This type of dissolution procedure (this is virtually the only type with which the accountant must deal) may be divided into two parts:

1. The dissolution transaction by which the property attaching to the equity being retired is constructively distributed in retirement of that equity element.
2. The repurchase transaction by which the above unascertained and still undivided share of property is returned to the business entity by a cash purchase at the current market or transaction price.

The effect of the two transactions by which the dissolution and the cash settlement are completed is to discharge an old property by removing its current carrying basis within the books of account and, then, to reacquire this undivided property interest at its current market price which becomes its new carrying basis within the books of account. Thus the bookkeeping procedure is made to give the net effect of removing the retired property at cost—its current carrying basis—and of admitting the reacquired property to a new carrying basis equal to its cash purchase price.

These principles apply alike to all types of equities.<sup>3</sup> Accounting liabilities are ownership equities and, as such, are elements of properties with asset elements of corresponding amounts. In an accounting sense, equities are elements of business

properties and not simply legal rights between individuals. Accounting equities can exist only in conjunction with assets and the combination of the two describe and measure the monetary amounts of business properties as measured by the actually executed business transactions through which these properties were acquired. Legal equities, on the contrary, measure contractual rights between individuals. These rights may and do continue to exist in complete disregard of the property security behind them. Their duration is also dependent upon legal conditions such as performance by liquidation or the running of the statute of limitations. Thus accounting equities are property elements, attached to, inseparable from, and responsive to the asset elements of such property while legal equities are claims against individuals without regard to their property status. The purpose of accounting equities is to measure the monetary amount of the transaction carrying basis of business properties currently at rest within the business entity, whereas, the purpose of the legal equities is to measure the contractual claims against the legal entity of the business. As a result the accounting equity elements of the business properties may never exceed the asset elements of these properties but the legal equities against the legal entity may exceed the asset property elements without limit. The excess of legal equity claims over asset property elements measures the monetary excess of the legal claims against the legal entity of the business over the monetary transaction carrying basis of the asset property elements of the fictitious accounting business entity.

No one, perhaps, would assume that a business borrows an equity; instead it borrows a property. This property, the business entity converts to a form useful

<sup>3</sup> See the writer's article on "Bond Discount and Debt Expense in Terms of Consistent Accounting," in *ACCOUNTING REVIEW*, June, 1940.

to its operations and business of making a profit. When it has accumulated adequate funds of its own, the business entity often purchases its borrowed property. Businesses do not exchange equities for assets because, until the business has some assets, its equities are purely imaginary. And once the business secures assets through investment transactions, it inevitably has equities of exactly equal amount; so, there are no assets, not already paired with equities, which could be exchanged for other equities. Neither does a business exchange an asset for an asset or an equity for an equity except in case of purely legal changes in the description of equities.<sup>3</sup> A business transaction, whatever its nature and whatever its subject matter, is an exchange of one business property for another. Under the double-entry system of accounting such properties have asset and equity elements of equal amount based on a transaction price of identical origin. There can be no consistent principles of double-entry accounting under conditions which assume double-entry property concepts for certain transactions and single-entry property concepts for other transactions.

Double-entry accounting cannot be derived from the accounting principle of equated asset and equity elements for each separate property and yet survive upon the bookkeeping rule of equal debits and credits. The asset and equity property elements are the means by which to identify the complete double-entry accounting composition of the property subject matter of a business transaction without regard to which element of the property is identified by the transaction. Hence, the

transfer of an equity is the transfer of a property whose double-entry carrying basis is equal to the carrying basis of the equity in question. Though the asset elements are unapportioned to individual equity elements, it is, nevertheless, essential to make such an apportionment as a prerequisite to the retirement of any accounting equity. Any division of the equity elements as a means of identifying the parties to a business transaction requires an exactly similar division of the asset property elements as a means of identifying the property subject matter of such transaction. Since all business transactions must deal in either an identified asset or an identified equity property element, the double-entry accounting system provides the necessary information for the identification of the double-entry composition of any property which can become the subject matter of an executed business transaction.

Thus the double-entry accounting system describes the business properties in terms of the only property elements which can become the identified subject matter of business transactions. The actually executed business transactions of a business entity measure the transaction price at which the inward and outward flow of property through the business enterprise takes place. If this transaction flow of property to and from the business enterprise is measured by application of the principle of equated asset and equity property elements of an identical price origin, it follows that the asset and equity property elements reflected by the books of account at any instant of time will give a correct measure of the transaction carrying basis of the properties at rest within the business entity. The operation of this principle of accounting valuation may be graphically illustrated as follows:

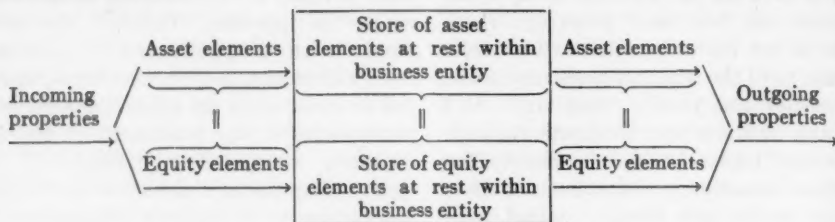
<sup>3</sup> See the writer's article in the September, 1939, issue of *ACCOUNTING REVIEW*, pp. 276 and 278, for a more detailed discussion of purely legal changes in accounting equities.



Inward flow of property through actually executed business transactions.

Valuation of store of property at rest within business entity.

Outward flow of property through actually executed business transactions.



The accuracy of the monetary amounts resulting from this basis of accounting valuation is exactly as great as the accuracy of the amortization computations by which the amount of the outward flow of business properties through actually executed business transactions was determined. The amortization computations obviously embrace an area of accounting valuation which cannot be controlled by the double-entry principles of accounting and is, therefore, a matter beyond the scope of this article.

#### MAGNITUDE OF ERRORS IN ACCOUNTING VALUATION

An examination of published statements reveal that the business properties may be inflated by amounts varying from a few dollars to several million dollars through the retirement of a corporation's own stock at less than its carrying amount. In such

other transactions the corporate assets are deflated through the retirement of the corporation's own stock at a price greater than its current carrying basis. This error, however, appears to be much less frequent than the errors which result in an inflation of the business properties. Both are equally wrong and in direct conflict with the application of the principles of double-entry accounting valuation.

In a similar manner, corporate assets are inflated by the retirement of bonds at less than their carrying basis while in other cases the properties are deflated by retirements in excess of the carrying basis. Again these results are directly at variance with the principles of double-entry accounting valuation.

An illustration will serve to point out the extent of errors in accounting valuation which may result from such practices. Assume the following balance-sheet:

Assets.....	\$10,000,000
	<u><u>\$10,000,000</u></u>

Bonds.....	\$ 5,000,000
Stock (80,000 shares).....	8,000,000
Deficit (-).....	3,000,000
	<u><u>\$10,000,000</u></u>

cases the evidence of inflation is usually confined to the difference between the retirement price and par or stated value of the stock retired. No cognizance whatever is generally taken of the proportion of surplus likewise retired with the stock. In

It will now be assumed that the stringent financial condition is further aggravated by severe depression conditions as a result of which the stock is selling at \$10 and the bonds at \$50 per \$100 of par value. A group of wealthy individuals investigate



the situation and conclude that the prospects for the business after the turn of the depression are very bright. They decide to purchase a controlling interest consisting of 41,000 of the 80,000 shares of stock outstanding. They immediately advance the corporation sufficient funds with which to retire the old bond issue and the remainder of the outstanding capital stock by the purchase of a new issue of bonds.

According to current accounting practice the entries to record these transactions would be as follows:<sup>4</sup>

1. Acquisition of a controlling interest:

No entry. The business entity was not a party to the transaction.

2. Floating of new bond issue:

Cash .....	\$2,890,000	
Bonds payable .....		\$ 2,890,000

3. Retirement of the old bond issue:

Bonds payable .....	5,000,000	
Cash .....		2,500,000
Surplus .....		2,500,000

4. Retirement of remaining outstanding capital stock:

Capital stock .....	3,900,000	
Cash .....		390,000
Surplus .....		3,510,000

The resulting balance-sheet presentation would be:

Assets .....	\$10,000,000
	<u>\$10,000,000</u>

suspends the operation of double-entry accounting principles but it also implies

Bonds payable .....	\$ 2,890,000
Capital stock .....	4,100,000
Surplus .....	3,010,000
	<u>\$10,000,000</u>

As a result of this series of transactions more than half the properties of the business entity have composed the subject matter of business transactions to which the business entity was a party at prices vastly different from the current carrying amounts of these properties. All of the old bond equities and nearly half of the capital stock equities have been retired at prices radically different from their carrying

that equities alone constitute a complete business property and that transactions involving them can have no effect beyond the current market price upon the asset property elements. Such an assumption necessarily requires the conclusion that the asset and equity elements each represent a distinct and independent property in which the business entity may deal separately. If this condition be true then it would appear that a determination of the total business properties would require that the total assets and equities be added

<sup>4</sup> A somewhat similar discussion but from a different point of view is presented in an article by the writer in *ACCOUNTING REVIEW*, June, 1940, pp. 212-215.

rather than equated. And even if the equated condition be accepted, it is a condition devoid of substance as it depends

asset and equity property elements will give radically different results. The entries that would be required are as follows:

1. Acquisition of a controlling interest:			
No entry. The business entity was not a party to this transaction.			
2. Floating of new bond issue:			
Cash.....	\$2,890,000		
Bonds payable.....		\$ 2,890,000	
3. Retirement of the old bond issue:			
Bonds payable.....	5,000,000		
Cash.....		2,500,000	
Unspecified assets.....		2,500,000	
4. Retirement of remaining outstanding stock:			
Capital stock.....	3,900,000		
Cash.....		390,000	
Deficit.....		1,462,500	
Unspecified assets.....		2,047,500	

upon the exercise of the bookkeeping rule of equal debits and credits rather than the

The adjusted balance in accordance with the operation of these principles would be:

Assets.....	\$10,000,000
Less adjustment.....	4,547,500
	<u>\$ 5,452,500</u>

Bonds payable.....	\$ 2,890,000
Capital stock.....	4,100,000
Less deficit.....	1,537,500
	<u>\$ 5,452,500</u>

operation of the double-entry accounting principle of equating asset and equity elements in terms of the identical prices from which these elements originated in the transactions through which the retired properties were acquired. Such practice, in reality, amounts to a consolidation of two independent systems of single-entry accounting with the addition of an intermediate debit and credit device by which periodically to bring the two systems into balance. Balance, rather than the quantitative measurement of business properties in terms of executed transaction prices, is the only objective that is consistent with the whole of current accounting practice.<sup>5</sup>

A recording of the above transactions in accordance with the principle of equated

That the difference in the results is sufficiently great to be of genuine concern, there can be no doubt. That these errors will be projected into the accounting valuation figures for an indefinite time in the future, there can also be little doubt. Then it must be evident that the matter of procedure with respect to these types of transactions is not merely a matter of bookkeeping routine but very definitely a matter of accounting valuation. If the basic data from which accounting valuations are taken is distorted by the bookkeeping procedures in the recording process, it must be true that the accounting valuations will be equally distorted. On the contrary, if the accounting principles of valuation so control the operation of the bookkeeping mechanics as to make the books of account reflect the proper amounts for the asset and equity elements of the properties of the business entity, it

<sup>5</sup> It is interesting to note that this matter of balance has bothered such practitioners as Robert H. Montgomery. See his article entitled "The Curse of Balancing or Theory vs. Practice," in the April, 1937, issue of *The Journal of Accountancy*.

would appear that the remaining difficulties in the way of accurate accounting valuation would be relatively small.

But, if an error of several million dollars (the illustration is extreme but by no means impossible) in accounting valuation is compelled by the effects of generally accepted accounting practice, whereas, this entire error may be eliminated by consistently following basic accounting principles underlying the concepts of double-entry accounting, then this is a matter of grave concern to the entire accounting profession. Such errors are not only committed but they are unrevealed, undetected, and for the most part undiscoverable because they conform to the pattern of valuation which is generally accepted as producing correct results. This raises a question of fact, and what are the facts depends upon the circumstances and the basic assumptions underlying them.

The writer does not claim that his views are infallible. But if they are wrong this fact should be capable of demonstration and no one would be more grateful than the writer for the discovery of any basic fallacy. However, these views are based upon simple concepts which, it is believed, have been consistently applied. The essential elements underlying these views may be summarized as follows:

1. Do accounting assets and equities in reality have their origin in the dual compositions of a single business property?
2. If this is the source of their origin, then

is not their equality due to the fact that both are measured by an identical transaction price?

3. Given this identity of their origin, is not their continued existence dependent upon a singular property substance wholly indivisible as between the two?
4. Given this inseparable nature, does it not follow that any transaction involving one element must also involve an exactly similar amount of the inseparable component element?
5. Under these conditions, does it not follow that the retirement of any one of these property elements inevitably requires the retirement of an exactly similar amount of the other component element as a prerequisite to establishing the bona fide relationship between the amounts and the business properties which the amounts measure?
6. Does not this establish the principle of equated asset and equity elements in identifying property subject matter of every executed business transaction?
7. Can this principle be set aside by substituting the bookkeeping rule of equal debits and credits without nullifying every basic concept from which double-entry accounting has been derived?
8. Does not the application of the principle of equated asset and equity property elements to accounting valuation give amounts which are much more in accord with a common sense judgment of what these amounts should be than does current accounting practice?

# A SUGGESTION FOR THE MEASUREMENT OF SOLVENCY

I. M. MACKLER

**E**STIMATES have been made that 90% of the business transacted in the United States is carried on through credit extension. The importance of dealings on open account, notes and similar evidences of indebtedness necessitates reliable measures of financial condition in order to estimate the flow of cash and reduce to a minimum the losses incurred through the granting of credit.

For many years accountants and credit men have used the current ratio as an index of the debt-paying ability of business enterprises. But the current ratio portrays only static conditions, and it has been found necessary to use additional ratios in order to measure the dynamic aspects of business not shown by the balance sheet alone. The need for these additional ratios coupled with the resultant shift to the consideration of the effects of cyclical movements clearly revealed the inadequacy of the current ratio as an indicator of debt-paying ability. Obviously, in comparing two enterprises having the same current ratio, it is necessary to consider the rapidity of the current-asset turnover and the maturities of the current liabilities.

These points are emphasized by many writers who qualify the standard two-to-one ratio with the statement that it is not fixed but varies with the individual enterprise as well as with the type of industry. Kester<sup>1</sup> points out that a ratio of "two-to-one is not fair for all businesses nor for the same business at different times of the year, and certainly not at different times within the economic cycle running from

good times to bad." Specthrie<sup>2</sup> states, "Just what constitutes a satisfactory current ratio depends among other factors on the makeup of the current assets, the current terms affecting receivables and payables and the rate of inventory turnover."

Another author<sup>3</sup> concisely sums up the situation with the following: "No one ratio, no one comparison can possibly give a clear picture of the credit capacity of a financial statement and profit-and-loss account. Other ratios are also of vital significance. Each one in its turn tells a story and each one in conjunction with some other ratio and other facts then tells a supplemental story, but these stories, one and all, are relative, depending for their full significance on an understanding of industrial and commercial seasons and variations. A current ratio of 'two-to-one' on a fiscal balance sheet, taken at the low point of a season carries little significance unless it is realized that in the normal operations of that business, the ratio might shortly drop to 1.30 at the peak of the Spring season."

The most common definition of the current ratio is that it is an expression of relationship between current assets and current liabilities. To the layman this relationship means the amount of current assets available to meet current obligations. Needless to say, this conception is erroneous since the current ratio is seldom a comparison of similar facts. Neither does the two-to-one ratio indicate that the owners have invested in current assets an

<sup>1</sup> *Advanced Accounting*, R. B. Kester, Ronald Press (N. Y.), 3rd Edition.

<sup>2</sup> *Mathematics for the Accountant*, S. W. Specthrie, Ronald Press, N. Y. 1940.

<sup>3</sup> *Behind the Scenes of Business*, Roy A. Foulke, Dun & Bradstreet, Inc., Revised Edition 1937.

amount equal to the monies supplied by the creditors<sup>4</sup> for this is predicated on the assumption that the realization of the current assets and the maturities of the current liabilities occur simultaneously. An examination of the current sections of the balance-sheet and the accounting techniques used in the valuation of the component items bears out the fallacy of this assumption.

An examination of the various bases of valuation which are applied to current assets reveals that:

1. Cash represents the aggregate of legal tender either on hand or in banks and hence presents no problems of valuation.
2. Accounts and notes receivable are shown at their estimated realizable value; i.e., the total of claims arising from sales or performances of services less reserves for discounts and doubtful accounts.
3. Securities held for temporary investment are shown at cost or the lower of cost or market the latter being used more widely because of its inherent conservatism.
4. Inventories, likewise, are valued at cost or the lower of cost or market.
5. Prepaid expenses and deferred charges are valued at cost.

Since liabilities are usually stated at contractual value, few problems arise in this connection. Nevertheless, there is one in the case of liabilities of an uncertain amount where an estimate must be made for the balance-sheet. The best that can be expected is that a reserve be provided on the basis of the known facts and reasonable indications of probabilities. Then again, some authors mention the possibilities of valuing liabilities at present worth (by discounting the contractual value of the debt back to the date of the balance sheet), but this question is merely academic as practicing accountants have al-

ways opposed such a procedure.

A reliable measure of solvency should reveal the amount of funds that will be available to meet obligations as they fall due. To do this, all of the assets must be converted to cash value and expressed in relation to the liabilities as they mature. As shown above, assets are not valued on this basis nor should they be for balance-sheet purposes. However, to overcome the deficiencies of the current ratio and to develop a more precise measure of solvency, it will be necessary to revalue the assets along these lines.

In a discussion of the development of the current ratio, Wall and Dunning<sup>5</sup> make the following statement: "The current ratio is developed by marshaling two similar sets of facts with different qualities and setting them into relationship. Current assets and current liabilities are similar in their closeness to maturity."

For ordinary balance-sheet classification, there can be no disagreement with the foregoing statement. However, when considered for measuring solvency this statement may not be accepted so readily. The criterion establishing the difference between a current asset and a fixed asset and a current liability and a fixed liability (considered with respect to the time element) is respectively realization and liquidation within a period of one year from the date of the balance sheet. However, the maturities of current assets and current liabilities range through the year and no basis exists for the belief that the range of asset maturities averages out against the range of liability maturities with a resultant offsetting effect. If the time range were the same and the amounts of assets and liabilities of the same maturities were equal, no problems would arise. However, this is not the case under ordinary condi-

<sup>4</sup> "This two-to-one ration means that the owners of the business will have invested and used for the purchase of current assets an amount equal to the funds furnished by the creditors." *Advanced Accounting*, R. B. Kester, Ronald Press, New York, 3rd Revised Edition.

<sup>5</sup> *Ratio Analysis of Financial Statements*, Wall and Dunning, Harper Bros., 1928.



tions. Thus, a comparison of current assets with current liabilities without consideration of their maturity dates is an illogical and meaningless procedure when used as a measurement of debt-paying ability.

The current ratio, therefore, results in a very rough measure of solvency—a measure which must be supplemented with other ratios. That authorities qualify the two-to-one relationship is an indication of its lack of precision and meaning. Nor does the “acid test” (i.e. the ratio of cash plus receivables to current liabilities) reveal much more about debt-paying ability than does the current ratio. This test is subject to the same criticisms as the other. It is quite conceivable that a business with an acid test ratio of 100% might not be able promptly to meet its debts at maturity. Some conditions under which this might occur are: 1. a high proportion of receivables and other assets to cash; 2. a very slow collection of receivables; 3. a very near maturity date for the current liabilities.

In view of the deficiencies of the current ratio, is it possible to devise some measure which alone will indicate the ability of a business to meet its obligations as they mature? In addition, can a measure be developed which will also permit comparison of one business enterprise with another whether or not engaged in the same line of endeavor? In the opinion of this writer, the answer is: yes.

This measure must reveal more precisely the extent to which current assets can be utilized in payment of maturing current liabilities. If the result indicates a two-to-one relationship, it must mean that the current assets available to meet current liabilities are twice the latter—no more, no less. A measure of this type will permit standards to be set—standards which can be interpreted by all, even those with no knowledge whatsoever of accounting.

The following procedures are necessary

to produce a measure devoid of the criticisms inherent in the ordinary current ratio technique:

1. Restating the valuation bases of current assets and current liabilities to a cash-fund basis.
2. Relating the maturities of current assets and current liabilities to a common point of time so that the result will indicate the amount of funds realizable at that time for the payment of liabilities then falling due.

Since the chief concern is a constant flow of funds to be available for paying debts, current assets must be converted to a basis which will indicate future cash flow. We need say nothing more about cash. Temporary investments, likewise, may be easily dispensed with as they ordinarily present no problems of conversion in respect to either amount or time. The flow of funds from accounts and notes receivable will equal the amounts stated on the balance sheet, less, of course, any discounts or allowances customarily taken as well as the usual provisions for doubtful accounts. If discounts are permitted, an estimate of those to be taken should be deducted from the accounts receivable.

The question of the inventory is interesting, for inventories are usually stated on the balance sheet at cost or the lower of cost or market. If we were to use these bases in our estimates of the flow of cash, the effect would be to ignore the gross-profit factor realizable when merchandise is sold and hence available for meeting debts. The avoidance of this will be illustrated subsequently by the use of ratios which include gross-profit elements.

Prepaid expenses and other deferred charges must be considered next. Although there is no question as to the currency of those prepaid expenses which will be utilized within the course of a year, they must be omitted in determining solvency since their utilization does not result in an inflow of funds but rather in a reduction of the outgo for the period. Funds are realized from the operations of the trading cycle,

and since prepaid expenses and deferred charges have nothing to do with such a cycle and the realization of funds they must be left out of consideration.

Liabilities present relatively few problems since they are ordinarily stated at maturity values. To reflect cash needs an estimate should be made of likely cash discounts to be allowed by creditors and these should be deducted from the accounts payable; the estimate may be made on the basis of the firm's past experience in respect to discounts. Deferred credits should be handled in the same manner as deferred charges, i.e., excluded from the calculations for the converse of reasons laid down for the exclusion of deferred charges.

In relating the maturities of current assets and current liabilities to a common point of time, current liabilities should be

made the starting point. An examination of these will reveal the most significant items. The auditor dealing directly with these and the credit man through his knowledge of the industry in question will know the maturity dates. If the accounts payable are the material components of the current liabilities and the credit terms average thirty days, thirty days will be the common point. If the usual credit terms are sixty days, then sixty days becomes the common point. If other liabilities are the material components, the maturity period of these becomes the relating point. It is now necessary to determine the amount of funds that will be available to meet the liabilities maturing at the common point of time.

The following illustrative data demonstrate how the modified ratio is computed:

ILLUSTRATION NO. 1  
COMPANY X

BALANCE SHEET		JANUARY 31, 1941	
<i>Current Assets</i>		<i>Current Liabilities</i>	
Cash.....	\$ 40,284	Trade creditors (net).....	\$105,464
Temporary investments at the lower of cost or market.....	50,000	Miscellaneous current liabilities....	7,000
Accounts receivable, Net of Reserves	50,136	Deferred income.....	872
Inventories.....	138,984	Total Current liabilities.....	113,336
Prepaid expenses.....	6,496	Excess of assets over liabilities.....	172,564
Total Current assets.....	\$285,900	Total liabilities and capital.....	\$285,900
Sales for the year: \$496,992			
Customers' Terms: 30 days net			
Creditors' Terms: 30 days net			

Collection Period of Outstanding Accounts Receivable—

$$\frac{\text{Sales}}{\text{Accounts Receivable}} = \frac{\$496,992}{\$50,136} = 9.92$$

$$\frac{365}{9.92} = 37 \text{ days}$$

Period required to convert inventory to cash—

$$\frac{\text{Sales}}{\text{Inventory}^*} = \frac{\$496,992}{\$138,984} = 3.5$$

$$\frac{365}{3.5} = 104 \text{ days}$$

\* By the use of this ratio, the gross profit resulting from the sale of the inventory plus the original cost is included among the funds available for the payment of liabilities. The ordinary ratio of cost of sales to inventory does not consider the effect of the gross profit element and hence would not accurately reveal the future cash flow.

## Converting the assets to a 30-day cash basis—

Cash .....	\$ 40,284
Temporary investments .....	50,000
Accounts receivable:	
$\$50,136 \times \frac{30}{37}$ = amount realizable in 30 days .....	40,651

## Inventories:

$\$138,984 \times \frac{30}{141}$ = Cash realizable from inventory in 30 days <sup>7</sup> .....	29,571
Funds available in 30 days .....	<u>\$160,506</u>

## Determining the liabilities due in 30 days—

Accounts payable, due in 30 days net .....	105,464
Miscellaneous current liabilities:	
1/12 of \$7,000 <sup>8</sup> .....	583
Liabilities due in 30 days .....	<u>\$106,047</u>

$$\text{Modified ratio} = \frac{\$160,506}{\$106,047} = 1.51$$

Current assets of \$1.51 are thus available under normal conditions to meet every \$1.00 of maturing current liabilities

$$\text{Ordinary current ratio} = \frac{\$285,900}{\$113,336} = 2.52$$

ILLUSTRATION NO. 2  
COMPANY Y

BALANCE SHEET		JANUARY 31, 1941	
<i>Current Assets</i>		<i>Current Liabilities</i>	
Cash .....	\$ 27,500	Notes payable .....	\$100,000
Accounts receivable, net .....	375,000	Accounts payable (net) .....	150,000
Inventory .....	400,000	Accrued expenses .....	25,000
		Total liabilities .....	275,000
		Excess of assets over liabilities .....	527,500
Total assets .....	<u>\$802,500</u>	Total liabilities and capital .....	<u>\$802,500</u>
Net Sales for the year \$1,500,000			
Customers' Terms: 90 days			
Creditors' Terms: 30 days			

## Collection period of outstanding accounts receivable—

$$\frac{\text{Sales}}{\text{Accounts receivable}} = \frac{\$1,500,000}{\$375,000} = 4$$

<sup>7</sup> The denominator of 141 days was used since it takes that time to convert inventory into cash—104 days to sell the merchandise inventory and 37 days more to collect the accounts receivable. In view of this fact, the reader might wonder how any cash can be realized on the inventory within the 30-day period, since any amounts sold would not become due before this time as a result of the credit terms. This, however, is explainable by the fact that part of the credit sales will be anticipated and some sales will probably be on a cash basis.

<sup>8</sup> For illustrative purposes it has been assumed that the maturities average out during the year; hence 1/12 will become due in 30 days.

$$\begin{aligned} \text{Period required to convert inventory to cash—} & \frac{365}{4} = 91 \text{ days} \\ \frac{\text{Sales}}{\text{Inventory}} &= \frac{\$1,500,000}{\$400,000} = 3.75 \\ \frac{365}{3.75} &= 97 \text{ days} \end{aligned}$$

Converting the assets to a 30-day cash basis—

Cash ..... \$ 27,500

Accounts receivable:

$\$375,000 \times \frac{30}{91}$  = amount realizable in 30 days ..... 125,000

Inventory:

$\$400,000 \times \frac{30}{188}$  = ..... 63,830

Funds available in 30 days ..... \$216,330

Computing the liabilities due in 30 days—

Notes payable, due in 30 days ..... \$100,000

Accounts payable, due in 30 days net ..... 150,000

Accrued expenses, due in 30 days net ..... 25,000

Liabilities due in 30 days ..... \$275,000

Modified ratio =  $\frac{\$216,330}{\$275,000} = .79$

Current assets of \$.79 are available to meet every \$1.00 of maturing current liabilities

Ordinary current ratio =  $\frac{\$802,500}{\$275,000} = 2.92$

The illustrations indicate that the modified ratio offers a better approach to the problem than the liquidation basis suggested by some authors<sup>9</sup> in an example where they estimated the liquidity of current assets by a percentage method. This solution represents no more than a rough approximation and ignores the orderly flow of cash into and out of a going concern. The use of liquidation values places the business under conditions which are not normal and hence results in an inaccurate measure of debt-paying ability.

F. W. Woodbridge<sup>10</sup> has proposed a

<sup>9</sup> *Ratio Analysis of Financial Statements*, Wall and Dunning, Harper & Bros., 1928.

<sup>10</sup> "Time as a Factor in Determining Debt-Paying Ability," F. W. Woodbridge, *ACCOUNTING REVIEW*, September, 1939.

method for a more accurate measurement of debt-paying ability. However, the procedure outlined for the synchronization of current assets and current liabilities on the basis of expected realization and maturity requires monthly data of the previous year since the current year's expected cash realization is based on last year's experience adjusted for current changes. The amount of detailed data required by this method is such as to render the procedure useful to insiders only—i.e. to controllers, treasurers and managers.

Although the modified current ratio is more precise than the ordinary current ratio, it obviously falls short of perfection. The turnover ratios used to determine the flow of cash, at best, result in estimates.

Then again, it fails to take into consideration any seasonal changes since the figures used are those of the balance sheet at the close of the fiscal period and the profit-and-loss statement for the period then ended. In addition, there are important variables over which the analyst has little control,

namely general economic conditions and the general level of prices. A radical shift in either of these can nullify the most elaborate calculations of debt-paying ability. These are, however, qualitative factors and cannot be measured with mathematical accuracy.

## ACCOUNTING FOR INTANGIBLE ASSETS

HAROLD G. AVERY

**D**URING the eleven-year period 1929-1939, ninety-eight industrial concerns in the United States decreased the values of intangible assets on their books approximately \$786,000,000 or, roughly an amount equal to one-fourth of the direct American investments in Latin America in categories such as mines, utilities, packing plants, and oil wells. While some firms were adopting the conservative principle of writing down their intangible asset values, thirty-eight firms increased the account totals and nineteen withdrew the intangible values from the general property account for a total of \$178,000,000, leaving a net decrease in the valuation of intangible assets on the books of 155 firms in the amount of \$608,000,000—a tidy sum indeed with a prospective earning power of six per cent! What is the accounting significance of such a valuation retrenchment? Does such a decrease represent a trend of accounting practice in evaluating and recording intangible property on the books of industrial concerns? Have accounting principles for recording the acquisition and ownership of intangible rights and privileges changed during the past decade or so? An examination of the balance sheets of over three hundred industrial corporations may throw some light on the answers to these and other pertinent questions. Therefore, an analysis of the write-downs and a discussion of the valuation

procedure for intangible assets are the primary purposes of this study.

### METHOD OF PROCEDURE

The period 1929-1939 was chosen because it represents a complete business cycle extending from the prosperous peak of the late '20's to the more or less normal year of 1939 which preceded the beginning of an abnormal cycle of defense activity or war preparation. The material for the study was obtained from Moody's *Manual of Investments—Industrial Securities* for 1930 and 1940. The balance sheets of 346 representative industrial corporations in the United States were included, and these were classified by Moody into industrial groups. Only those concerns were included where comparable and complete data could be obtained; and if the organization date of the corporation was subsequent to 1929, the balance sheet of its first year of operation was traced and recorded as part of the study. As a further check on the work, the valuation of the intangible items on the balance sheets were again verified for the year 1933 in Moody's *Manual* for 1934.

The intangible assets included in this study were taken from the fixed-asset or property section of the balance sheets, and included a wide variety of account names, each signifying an individual property right or claim. A list arranged alphabetically is held to be sufficient at this time:



Brands  
Charters  
Contract Rights  
Copyrights  
Designs  
Devices  
Formulas  
Franchises  
Goodwill  
Leaseholds  
Licenses  
Organization Expense

Patent Rights  
Patents  
Prepaid Royalties  
Privileges  
Processes  
Property Rights  
Royalties  
Timber Rights  
Trade-marks  
Trade Names  
Water Rights

# FIRMS CHANGING POLICY IN RECORDING INTANGIBLES

How many firms changed their policy in recording intangible asset values? This question is answered by analyzing the following table which shows the number of firms recording intangible items and the extent of the change during the eleven-year period, 1929-1939:

EXHIBIT 1. NUMBER OF FIRMS AND AMOUNT OF INTANGIBLE ASSETS ON BOOKS FOR THE YEARS 1939 AND 1929.  
ARRANGED BY INDUSTRIAL GROUPS

Industry	No. Firms in Group	Intangibles on Books			
		1939		1929	
		No. Firms	Amount (000 omitted)	No. Firms	Amount (000 omitted)
Agricultural—Implements . . . . .	4	2	\$ 1,044	3	\$ 18,948
Automobiles & Accessories . . . . .	27	20	54,320	21	137,202
Aviation Manufacturing . . . . .	6	4	1,212	5	2,599
Bldg. Material & Equipment . . . . .	14	9	3,498	5	5,671
Can Manufacturing . . . . .	3	1	*	2	44,594
Cement . . . . .	4	1	200	1	55
Chemicals . . . . .	16	12	60,580	12	58,498
Coal & Coke . . . . .	4	1	*	1	164
Distilleries . . . . .	4	3	10,691	3	21,365
Drugs, Cosmetics, Etc. . . . .	9	9	25,527	9	32,442
Electrical Equipment . . . . .	5	5	326	5	1,940
Fertilizers . . . . .	4	2	*	2	6
Floor Coverings . . . . .	4	2	*	2	1,967
Foods . . . . .	34	26	107,704	26	110,546
Glass & Glassware . . . . .	5	4	6	4	3,430
Machinery & Tools . . . . .	21	16	22,550	12	9,001
Metal Products . . . . .	6	5	2,246	5	1,843
Mining . . . . .	19	4	4,262	2	112
Motion Pictures . . . . .	4	1	8,332	1	8,182
Office Equipment . . . . .	6	5	11,688	6	30,894
Pulp & Paper . . . . .	8	4	8,253	4	925
Petroleum . . . . .	18	8	71,049	3	74,597
Railway Equipment . . . . .	10	7	22,057	5	25,934
Retail Stores . . . . .	28	15	13,300	16	42,967
Shoes—Manufacturing . . . . .	5	2	*	2	7,000
Soap & Cleaners . . . . .	2	2	*	2	2,883
Steel & Iron . . . . .	16	8	508	5	261,301
Sugar . . . . .	10	2	11	2	3,929
Textiles . . . . .	5	3	*	3	9,928
Tires & Rubber Goods . . . . .	6	2	*	4	58,936
Tobacco . . . . .	10	10	59,167	9	130,803
Unclassified . . . . .	29	17	62,220	19	50,005
Totals . . . . .	346	212	\$550,751	201	\$1,158,667

\* Nominal values.

	1939		1929				
	No. Firms	%	No. Firms	%	No.	Net Change	%
Total Balance Sheets.....	346	100.0	346	100.0			
Nominal Values recorded.....	115	33.2	68	19.6	47	(Increase)	69.1
Cost Values recorded.....	97	28.0	133	38.4	36	(Decrease)	27.0
Total (Exhibit 1).....	212	61.2	201	58.0	11	(Increase)	5.4
Values not recorded.....	134	38.8	145	42.0			

Amounts of \$1, \$2, \$3, etc. were considered nominal values for recording the intangible assets. A firm usually values each class of intangible assets at \$1 for balance sheet purposes. There was only one company valuing its intangibles at a nominal figure of over \$10, and that was \$14. Where values were recorded in the thousands, ten thousands, and even millions of dollars, the assumption was made that the company placed this value on the books as a cost figure, in keeping with fundamental account-

ing principles.

The table shows that the trend in accounting for the valuation of intangible assets is *definitely toward the policy of writing down the items to a nominal figure*, since 47 firms adopted this procedure during the period, or an increase of 69.1%. Furthermore, these figures do not include five companies originally establishing their intangible values at one dollar, nor one firm writing off its intangibles from the one dollar amount.

EXHIBIT 2. NUMBER OF FIRMS REPORTING NOMINAL VALUES OF INTANGIBLE ASSETS DURING ELEVEN-YEAR PERIOD 1929-1939, ARRANGED BY INDUSTRIAL GROUPS

Industry	1939 Total Firms	No. Firms Recording Nominal Values during Period	No. Firms Writing Down Values to Nominal Figures	Amount of Write-down (000 omitted)
Agricultural—Implements.....	1	1		
Automobiles & Accessories.....	14	8	6	\$ 80,714
Aviation Manufacturing.....	1	1		
Bldg. Material & Equip.....	4	2	2	5,472
Chemicals.....	6	5	1	580
Coal & Coke.....	1		1	164
Distillers.....	2	1	1	9,965
Drugs, Cosmetics, Etc.....	7	3	4	21,941
Electrical Equipment.....	3	2	1	1,625
Fertilizers.....	2	1	1	6
Floor Coverings.....	2		2	1,967
Foods.....	12	9	3	14,176
Glass & Glassware.....	3	1	2	3,370
Machinery & Tools.....	6	2	4	2,711
Metal Products.....	2	2		
Mining.....	2		2	112
Office Equipment.....	3	2	1	10,000
Pulp & Paper.....	1	1		
Railway Equipment.....	2	1	1	13,591
Retail Stores.....	15	12	3	25,667
Shoes—Manufacturing.....	2	1	1	7,000
Soap & Cleaners.....	1		1	2,883
Steel & Iron.....	3	2	1	260,369
Sugar.....	1	1		
Textiles.....	3		3	9,928
Tires & Rubber Goods.....	2	2		
Tobacco.....	7	4	3	66,577
Unclassified.....	7	4	3	18,982
Totals.....	115	68	47	\$557,800

Another interesting feature of the table shows that whereas 133 of the 346 firms, or 38.4%, recorded cost values on the books in 1929; only 97 of the total, or 28.0% recorded them in 1939—a decrease on the 1929 base of 27.0%.

The number of firms recording intangible assets shows an increase of eleven firms, or 5.4%, during the period; yet the valuation of the increased number is considerably less, as will be shown later. The increase in the number of firms recording intangible values is accounted for as follows: Ten firms wrote up their intangible assets from zero, and nineteen took them out of the property account during the period, for a total of 29. This number added to 201 makes a total of 230, from which is subtracted the eighteen firms writing down their intangible assets to zero, leaving 212 firms recording intangible values in 1939.

#### DOLLAR VALUES WRITTEN OFF DURING PERIOD

What is the extent of the write-down of intangible asset values during the eleven-year period? The following table serves as an answer to this question:

Over \$745 million was written off the books of 65 companies during the eleven-year period, or approximately 64% of the original book value of all the companies. This sum represents quite an amount of capital investment to be charged off the books. Lack of information made it impossible to determine the accounting method that was used in performing this dehydrating process. Several methods were noted however, although there was no way in determining the comparative number or amount of each.

There are five general methods in writing off intangible assets—the same as in the case of depreciable fixed assets. Write-downs of intangible assets should be absorbed by reappraisal surplus first, if any such reappraisal surplus exists—say in the possibility of having appraised the intangible values in some preceding period at an appreciated figure. Such an action of reappraising intangibles at a higher figure is not recommended; nevertheless, it is possible in some isolated cases. Charging write-downs to operations, to earned surplus, and to capital surplus are the three methods most frequently used. One steel com-

	No. Firms	Book Value (000 omitted)	Per Cent
Intangibles on Books in 1929 (Exhibit 1) . . . . .	201	\$1,158,667	100.0
Decreases:			
Write-downs to Zero (Exhibit 3) . . . . .	18	\$ 187,254	16.1
Write-downs to Nominal Values (Exhibit 2) . . . . .	47	557,800	48.2
Total Write-downs . . . . .	65	\$ 745,054	64.3
Decreases in Account (Exhibit 4) . . . . .	33	\$ 41,611	3.6
Total Decreases . . . . .	98	\$ 786,665	67.9
Increases:			
Write-ups from Zero (Exhibit 3) . . . . .	10	\$ 12,980	1.1
Increases in Account (Exhibit 4) . . . . .	28	85,253	7.4
Withdrew Intangibles from Property Account . . . . .	19	80,516	6.9
Total Increases . . . . .	57	\$ 178,749	15.4
Net Decrease during eleven-year period . . . . .		\$ 607,916	52.5
Intangibles on Books in 1939 (Exhibit 1) . . . . .	212	\$ 550,751	47.5

pany, from 1901 until 1938, wrote off from time to time nearly \$750,000,000 of intangibles, of which \$182,000,000 was written off against current earnings, \$258,000,000 against capital surplus, and the remainder against earned surplus.<sup>1</sup> However, if the earnings and surplus accounts lack sufficient credits against which a write-off can be accomplished, action is taken by the stockholders to reduce legal capital and thereby establish a capital surplus account against which intangible values can be charged.

The total decreases shown by the table amount to 67.9% of the original value on the books in 1929. Nevertheless, 57 firms increased their intangible property account. Ten firms placed almost \$13,000,000 on their books during the period—a conservative figure in view of the huge sums that found their way into the books during the preceding decades. Twenty-eight firms increased the account, i.e., the debits were greater than the credits, in the amount of \$85,000,000; and nineteen firms withdrew their intangible items from the general property account for a total of

\$80,000,000. Altogether, 57 firms show total increases amounting to \$178,749,000.

Finally, Exhibit 1 shows that whereas 201 firms had a total of over a billion dollars in intangible assets on their books in 1929, 212 firms eleven years later had a valuation of \$550 million, or 47.5% of the original amount.

#### CHANGES IN INDUSTRIAL GROUPS

It appears that companies within a particular group tend to adopt a similar policy with regard to the valuation of intangible assets. Thirty-two groups are included in the 1929 recordings of intangible asset values; eight of these groups reduced intangibles to nominal amounts during the eleven-year period. If one leading company in a group writes down its intangible property values, the others within the group tend to adopt the same procedure.

Fourteen firms in the Automobiles & Accessories group have nominal values at the end of 1939, fifteen in Retail Stores, and twelve in the Foods group. Chemicals, Drugs, Machinery & Tools, and Tobacco each show nominal values in over five companies. Four firms in the Building Material & Equipment industry conversely adopted

<sup>1</sup> United States Steel Corporation, *T.N.E.C. Papers*, Vol. II, p. 13 (comprising the pamphlets and charts submitted by the United States Steel Corporation to the Temporary National Economic Committee).

EXHIBIT 3. NUMBER OF FIRMS AND AMOUNT OF WRITE-DOWNS TO AND WRITE-UPS FROM ZERO OF INTANGIBLE ASSETS DURING ELEVEN-YEAR PERIOD 1929-1939, ARRANGED BY INDUSTRIAL GROUPS

Industry	Write-down to Zero	Amount (000 omitted)	Write-up from Zero	Amount (000 omitted)
Agricultural—Implements . . . . .	1	\$ 17,904		
Automobiles & Accessories . . . . .	1	2,438		
Aviation Manufacturing . . . . .	1	674		
Bldg. Material Equipment . . . . .			4	\$ 3,442
Can Manufacturing . . . . .	1	44,594		
Distillers . . . . .	1	11,400		
Foods . . . . .	2	1,314	2	9,371
Machinery & Tools . . . . .	1	2,537	1	22
Office Equipment . . . . .	1	3,099		
Pulp & Paper . . . . .	1	54		
Petroleum . . . . .	1	28,190		
Railway Equipment . . . . .			1	66
Retail Stores . . . . .	1	4,000		
Sugar . . . . .	1	3,929	1	11
Tires & Rubber Goods . . . . .	2	58,936		
Tobacco . . . . .			1	68
Unclassified . . . . .	3	8,185		
Totals . . . . .	18	\$187,254	10	\$12,980

a policy of bringing intangible assets on the books at cost value during the period.

Ten of the nineteen changes appear in two industrial groups in the case of industries separating intangible assets from the general property account.

#### VALUATION OF INTANGIBLE ASSETS

At the time of acquisition, the valuation of intangible assets is based on "actual" cost, either cash or equivalent value. After original cost has been established on the books, the intangible items are valued at cost less amortization, provided the class of intangible property is subject thereto. The classification of intangible assets will be discussed in a subsequent section.

Where a right or privilege is purchased for cash, no one will object to the listing of that intangible item in the accounts of the company at its purchase price. Also if legal fees, models, drawings, development expenses, and defense costs under a litigation proceeding are expended in order to acquire, develop, or protect an asset of this nature, the total expenditure can be capi-

talized as the cost of the asset. The *Hearings before the Temporary National Economic Committee on Patents, Part 2*, contained evidence to the effect that in one instance over \$800,000 was expended to develop a patent device.<sup>2</sup> The \$800,000 is a legitimate cost of the patent and could be capitalized on the books of the company and amortized over the life of the patent.

It is the "equivalent value" that should receive more attention on the part of accountants before arriving at the conclusion that this amount is justifiable for balance sheet purposes. Sometimes the "equivalent value" represents a fictitious amount and provides a method of overstating the value of the capital stock. Take for example a situation of this kind: Three partners having net assets (assets minus liabilities) in a business amounting to \$360,000 decide to incorporate; and thereby issue to themselves 5,000 shares of common stock at par value of \$100 per share, or a total of \$500,000. After incorporation a goodwill item is found on the books amounting to \$140,000

<sup>2</sup> Page 312.

EXHIBIT 4. NUMBER OF FIRMS REPORTING INCREASES AND DECREASES IN INTANGIBLE ASSETS DURING ELEVEN-YEAR PERIOD 1929-1939, ARRANGED BY INDUSTRIAL GROUPS

Industry	Increase		Decrease	
	No. Firms	Amount (000 omitted)	No. Firms	Amount (000 omitted)
Automobiles & Accessories.....	3	\$ 1,571	3	\$ 1,301
Aviation Manufacturing.....	2	23	1	736
Bldg. Material Equipment.....			1	143
Cement.....	1	145		
Chemicals.....	2	3,304	2	642
Drugs, Cosmetics, Etc.....	2	15,026		
Electrical Equipment.....	1	164	1	153
Foods.....	3	18,617	9	15,340
Glass & Glassware.....			1	54
Machinery & Tools.....	3	1,267	2	902
Metal Products.....	2	428	1	25
Motion Pictures & Theaters.....	1	150		
Office Equipment.....			2	6,107
Pulp & Paper.....			1	184
Petroleum.....	1	715	2	3,943
Railway Equipment.....	1	119	1	1,471
Steel & Iron.....			1	909
Tobacco.....			1	5,127
Unclassified.....	6	43,724	4	4,574
Totals.....	28	\$85,253	33	\$41,611



—the difference between the net assets of the partnership and the “equivalent value” of the new shares of stock. The market price of the stock is impossible to calculate, so the par value is used. Such transactions defeat the purpose of the valuation rule, and almost verge on financial legerdemain.

Consolidations, mergers, reorganizations, and admission of new partners have given companies the opportunity to establish unreasonable figures on their balance sheets for intangible items. In verity it can just as well be the result of a bad bargain, since the net assets, exclusive of goodwill, are less than the capital stock or net worth contributions. Some accountants have seen the weakness of such bookkeeping for intangible property and blame the situation on the accounting axiom that “the balance sheet must balance.” If such is the case, why is it not possible to establish an account and label it “Deficiency in Net Assets” or “Contributed Capital in Intangible Assets,” and deduct the debit balance in the account from the net-worth or capital-stock figures? Assuming that the corporation has no earned surplus available, the account is shown as a deduction from legal or contributed capital instead of being shown as an asset.

Many states, however, require that a corporation retain the legal capital intact for the benefit of the creditors, and such an entry as above cannot be made. Nevertheless, are creditors better off when intangible values are shown as assets? It seems that they will be much better informed of the actual situation if the deduction were made from legal capital, and certainly so if the deduction were made from capital surplus (contributed capital). Valuation reserves are recognized as valid deductions from the asset accounts, and the idea of deducting treasury bonds from the liability account to show the bonds payable to outside creditors is acknowledged to be better practice than carrying the treasury bonds

as assets. Treasury stock has to be purchased out of earned surplus in some states i.e., when the company's own stock is purchased, a reserve for the amount required has to be set aside out of earned surplus. Therefore, it is logical to believe that deficiencies arising in the purchase of net assets can be deductible from the net worth or capital stock account.

Bankers and credit men for a good many years have discouraged the recognition of balance-sheet figures attributed to intangible items, and insist that they be written down to nominal amounts. This study shows that their recommendation has been quite widely accepted during the past decade.

#### CLASSIFICATION OF INTANGIBLE ASSETS

Intangible assets are generally grouped into two classes: those subject to amortization, and those that are not. Practically all of the intangible items are subject to amortization with the exception of goodwill, trade names, and trade-marks. Patents, designs, copyrights, charters, and franchises are granted by some governmental authority for a definite period of time. Leaseholds, licensing agreements, formulas, processes, privileges (not governmental) are granted by private individuals or organizations; yet they usually have expiration limits. There are many kinds of property rights—some granted by law, and others granted by individuals who hold the basic property rights such as fee simple title, estates for life, etc.

Leaseholds should be distinguished from leasehold improvements. The former is the intangible right; the latter usually consists of depreciable fixed assets, and are classified as such, although the depreciation rates are based on the length of the leasehold if the lease expires before the useful life of the asset.

The classification of organization expense is a mooted point. Some accountants

believe that such an expenditure should be classified as an intangible asset and carried on the books permanently, since the outlay theoretically benefits the organization during its entire life. On the other hand, the more conservative point of view is to capitalize the initial costs of organization, classify them as a deferred charge, and write them off as rapidly as possible during the first few years of operation.

No attempt will be made in this article to discuss each intangible asset fully. However, the following chart of intangible assets shows the more important aspects of each account:

#### INTANGIBLE ASSETS ON THE BALANCE SHEET

Intangible assets should be separated from the general property accounts. During the eleven-year period nineteen companies withdrew the intangible items from the general property account for balance-sheet purposes. Ten of these changes appear in two industrial groups—Machinery & Tools, and Petroleum—and the amount classified as intangible assets in these two industries is \$46,280,000, or over half the total. The following table shows the industry and the amount of intangible asset accounts of the nineteen firms:

CHART OF INTANGIBLE ASSETS

Account	Grantor	Cost (Acquisition Price Excepted)	Duration	Amortization	Income Tax (Business Purposes)
Copyrights	Register of Copyrights Washington, D. C.	Drawings & fees	28 years, renewable once	Generally against first printing	Deductible
Franchises & Charters	Public	Legal fees	Term of years or perpetuity	Based on duration or first few years	Deductible
Formulas & Processes	Trade secret if not patented	Development expenses		Relatively short period	Deductible
Goodwill			No time element	Non-amortizable	Non-deductible
Labels	Register of Copyrights Washington, D. C.	Drawings & fees	28 years, renewable once	Relatively short period	Deductible
Leaseholds	Private	Legal fees	Term of years	Based on duration	Deductible
Licenses	Private & Public	Legal fees	Term of years	Based on duration	Deductible
Patents	Patent Office, Washington, D. C.	Legal fees, models, drawings, development	17 years, not renewable	Based on duration or sooner	Deductible
Patent Designs	Patent Office, Washington, D. C.	(Same as above)	3½, 7, or 14 yrs. Not renewable	Based on duration or sooner	Deductible
Property Rights	Private & Public	Legal fees	Term of years	Based on duration or first few years	Deductible
Royalties	Private	Legal fees	Term of years	Based on duration	Deductible
Trade-marks	Patent Office, Washington, D. C.	Drawings & fees	20 years, renewable for similar periods	Non-amortizable	Non-deductible
Trade-Names	First user	Drawings & legal fees	No time element	Non-amortizable	Non-deductible

Industry	Number Firms	Amount (000 omitted)
Distillers.....	1	\$10,691
Machinery & Tools.....	4	18,410
Mining.....	2	4,262
Pulp & Paper.....	1	7,566
Petroleum.....	6	27,870
Railway Equipment.....	1	11,000
Steel & Iron.....	3	485
Unclassified.....	1	232
Total.....	19	\$80,516

A study of the various balance sheets of industrial organizations shows a wide variation in the presentation of intangible assets. Some list the group under the heading of Fixed Assets; others classify these items as Intangible Assets in a separate group; still other balance sheets label the separate group as "Goodwill, Trade-marks, Brands, Designs, Etc.," depending upon the type of intangibles. The latter method seems to be the most widely used, especially when the amounts are carried at a nominal figure.

#### INTANGIBLE ASSETS NOT SUBJECT TO AMORTIZATION

When intangible assets are not subject to amortization, yet they have been paid for and the values duly recorded, the question arises as to what shall be done with these amounts as the years go by. One theory is that they should be carried on the books as long as the corporation exists—more or less a perpetual item. The other theory is based on the assumption that no item on the balance sheet exists permanently (not even debts); and therefore, goodwill, trade names, and trade marks should be written down to nominal values in sizable instalments over a period of years.

In this study only seven concerns out of 230 recording intangibles on their books in 1929 did not change the value in the account during the eleven years, and only two of these were strictly goodwill ac-

counts. These firms are classified as follows:

Industry	Name of Account	Amount (000 omitted)
Agricultural Implements...	Patents, Designs, Devices.....	\$ 1,044
Chemicals.....	Patents, Goodwill.....	21,306
Chemicals.....	Goodwill.....	5,000
Retail Store.....	Goodwill.....	7,000
Retail Store.....	Goodwill, Trade-marks.....	6,300
Railway Equipment.....	Patents, Goodwill.....	5,503
Tobacco.....	Brands, Trade-marks, Patents.....	54,099
	Total.....	\$100,252

Contrast these seven companies with the 47 organizations that decreased their intangible assets to nominal figures in the amount of \$557,800,000. Goodwill value is based on the anticipated excess earning power over the normal earnings in a particular industry, and even the capitalization of the excess earning power at a particular rate of interest assumes a future time limit. Goodwill is not necessarily perpetual simply because it is alleged to be the most fixed of fixed assets, i.e., the only manner in which one can convert the account into cash is to sell the business—or reorganize it. Goodwill is based on excess earning capacity, and when profits fall below normal within the industry (or even become losses), goodwill ceases to exist. It seems logical that if a company paid a sum equal to the anticipated excess earnings for two, three, or five years, at the end of that period, goodwill should have been written off against either current operations or earned surplus.

Even trade names and trade-marks have their day! A reading of Frank Presbrey's "*The History and Development of Advertising*" shows that even names and attachments are lost, forgotten, or stolen. Sometimes they suffer obsolescence, together with the product or firm which they repre-

sent. All of these contingencies can be provided for by writing down the items to nominal amounts over a period of years in which the intangibles enjoy a favorable advantage in customer acceptance.

#### CONCLUSION

This study shows that the trend in accounting for intangible assets is definitely toward the valuation of these items at a nominal figure, particularly goodwill, trademarks, and trade names. Intangible property subject to amortization is still valued at cost (cash or equivalent). No objection is found with this policy provided the cash or equivalent expenditure can be justified on reasonable grounds. Approximately \$550,751,000 of intangible property (both amortizable and non-amortizable) is still

found on the books of 212 of the 346 companies studied. A closer examination, however, shows that the bulk of this sum is found on the books of only 97 companies, since 115 organizations are valuing their intangible assets at a nominal amount. Apparently normal increases are found on the balance sheets of 28 companies for additional expenditures made for the acquisition, development, and protection of their intangible property.

Firms within the same industrial group tend to adopt the same policy toward accounting for their intangible assets; and finally, organizations are making a more thorough classification of their fixed-asset accounts, especially the separation of intangible property from the other real-property accounts.

## INDEPENDENT MUNICIPAL AUDITING

FLADGER F. TANNERY

SINCE AUDITING functions are performed by regular employees of the municipality and by independent public accountants and both before and after transactions have been completed, it is necessary at the beginning of this paper to distinguish independent municipal auditing from other types of auditing.

#### INTERNAL AUDITING

Auditing performed before a transaction is completed and the results thereof recorded in the accounting records is preauditing. This type of auditing is an administrative responsibility and provides for an examination, analysis, and review of the component parts of a transaction during the time the transaction is in the making, or at least before it is finally consummated and recorded. Preauditing is employed to determine the accuracy and legality of the transaction and to give the administrative

officials control over the financial affairs for which they are responsible. Auditing of this type should be accompanied by the authority to approve or disapprove a proposed or incomplete transaction on the basis of its compliance with the approved plan of operation—the budget. To be most effective, preauditing should be performed by employees of the accounting staff who are without authority to initiate transactions.

Internal check, a second type of internal auditing done before the results or analysis of a transaction are recorded finally, relates to a logical and systematic arrangement of the procedures and methods for analyzing, classifying, processing, and recording accounting documents and data: it is the interweaving of the accounting documents, forms, procedures, and the assignment of accounting and related duties in such a way that maximum utilization is made of

each factor along the lines of information, control, and protection.

Postauditing relates to an examination and analysis made after the transactions have been completed and the results recorded in the accounts: it is done by employees of the city and by independent public accountants. The audit procedures employed by these two types of postauditors are the same in many instances, yet the purposes for which the two types of audits are made and the approach taken by the different auditors vary considerably. The job of the internal postauditor is to carry on a continuous review of the work of administrative and operating subordinates and operating agencies of the city; and to check on the use and misuse of authority delegated to such persons and agencies and to determine that the regulations, operating policies, fiscal procedures, and accounting principles are being consistently followed by each agency. The internal postauditor is responsible to the chief accounting officer, or to the city manager, as the case may be; and, although he may be free of routine accounting operations, he is a part of the administration and is subject to its influences. Preauditing, internal check, and internal postauditing—all responsibilities of the administration—combine to form what is called "internal control" or "internal audit control"; and when properly integrated with the *system of accounts* and the work of the independent postauditor, a *system of accountability* is provided.

#### INDEPENDENT POSTAUDITING

The work of the independent postauditor provides an examination, review, analysis, and appraisal of the following after the transactions of the municipality have been analyzed and recorded by its accounting staff:

- (1) Fiscal activities and the essential facts surrounding these activities.
- (2) Methods and procedures employed

in carrying out these activities.

- (3) Legality of the activities and of the operating procedures employed.

- (4) Financial records and statements and the fairness, adequacy, and consistency with which accepted principles of governmental accounting were applied in analyzing and recording transactions and in reporting the financial condition and operations of the municipality.

In quality and extent, municipal independent auditing has not equaled auditing in the fields of business. The causes for this lack of progress perhaps are many, and each should be explored by independent public accountants and public officials. Because of time limitations, however, I am going to deal briefly with what is perhaps the major cause of this lack of progress; namely, the failure of the public officials, the layman and the public accountant to have a common concept of what an independent audit is and what should be accomplished by it.

#### THE PURPOSES SERVED BY AN INDEPENDENT AUDIT

The popular but erroneous belief on the part of both the public and the public official that an audit is made only for the purpose of detecting fraud or dishonesty has retarded the progress of municipal auditing and has robbed the municipality of independent and professional advice and consultation on problems in which accounting and fiscal matters are significant factors. Business men have long recognized that the establishment and maintenance of a system of accountability designed to prevent and detect errors of omission and commission, fraudulently or otherwise, is a responsibility of the management, and that while the work of the independent auditor is an important factor (the other three being preauditing, internal check, and internal postauditing) in such a system, the independent auditor provides valuable



service in a number of ways far more important.

Too often the public official fears an independent audit because of the possible implications that he has committed fraud or shown political favoritism, and the uninformed layman objects to its cost on the grounds of what he calls "expenditures for a duplication of work." Both the public official and the layman say: "Why worry about an audit, don't we have a good accountant keeping our city books?" This perhaps is true (he should be good) and it is also true that football teams usually have well qualified coaches to train them, but at game time, when the rights and privileges of more than one team and one group of fans become involved, the coaches, players, and fans of both teams recognized the need for a referee and demand his employment: they want an independent and unbiased appraisal of how each play of the game is executed. So it is with the functions of a municipality: the rights, privileges, and money of many persons are involved. The public, which is placing a large share of its annual income at the disposal of public officials to defray the cost of municipal services is entitled (at least annually) to an independent appraisal and unbiased report on how expediently or inexpediently the municipality's "plays" (fiscal affairs) are being conducted; and the public official in turn is entitled to the protection that is afforded him by having his constituency impartially advised. All too frequently the public official has criticism heaped upon him that is neither warranted nor just, and in some instances the public official sets his ultimate goal at keeping expenditures within the budget and gives little or no thought of how the service program of the city may be carried on without any impairment or loss of efficiency at a figure lower than the budget estimate. The public official instead of opposing the employment of an independent public auditor should in-

sist on an annual audit for his own protection and the people of the municipality should enact legislation demanding an annual independent audit: first to give them an independent appraisal of the city affairs, and second to help prevent and detect fraud. Good audits usually save the citizens money instead of costing them money and save good administrators from being falsely accused and improve the management of weak administrators.

There are a number of other advantages of an independent audit to both the public official and the people of the city that could be discussed at length, but I shall merely list the more important ones.

(1) It gives the chief executive an independent check on the work of his department staff. This check tends to increase the efficiency and accuracy of the accounting staff, and makes the current accounting data more reliable and the accounting records more useful to management.

(2) It furnishes the chief executive and the policy-determining body information and expert consultation on current problems of management, budget formation, tax assessment and collection, and policies in which accounting is an important factor.

(3) It provides an appraisal of both the system of accounts and the system accountability by persons far enough removed from daily routine to make an objective review. An accounting system, whether in a private corporation or governmental unit, requires constant revision due to ever-changing economic conditions if the system continues to fulfill its ultimate purpose. Governmental units have not kept pace with private business in modernizing their accounting records and fiscal procedures so as to gear them to the speed of our present day way of living and methods of business.

(4) It helps to advance the cause of democracy. Democracy includes among its basic principles those of faith, confidence, and accountability of public officials.

Secretiveness in governmental activities has no place in a democracy, except in the case of military operations in time of war when information of certain kinds are helpful to the enemy. Appraisals and reports of municipality activities, made by persons not responsible for the activities, create mutual confidence; remove fear and suspicion; help to make a satisfied and happy citizenry; encourage public service careers; and increase the quality of governmental services and the efficiency by which their services are carried on. All of these factors are significant to the continuation of democracy.

(5) It serves as a means of preventing and detecting fraud and dishonesty.

#### MUNICIPAL AUDIT STANDARDS

The failure of municipalities to utilize the services of the professional auditors and the comparative low quality of municipal auditing is due in a large measure to the lack of a statement of independent audit standards. Standards provide guides useful to the municipality and the public accountant in determining the scope, functions, and objectives of an independent audit. The only general publication on the subject of governmental auditing is *Bulletin No. 8* of the National Committee on Municipal Accounting<sup>1</sup> published in 1938; however, a few state postaudit agencies have published for use in their own states outlines setting forth minimum audit requirements. These documents, in the main, deal with procedures instead of standards.

Audit standards in this connection may be looked on as specific objectives to be obtained by application of audit procedures. Realizing of course that there is of necessity a substantial variation, by different practitioners on the same engagement, and by the same practitioners on different en-

agements, in the detailed procedures employed in attaining the objectives, the following tentative outline on what an audit should include is suggested with the hope of improving the quality and quantity of independent municipal audits:

(1) A brief of the legal provisions governing the city's fiscal operations. This should include the statutes of the state relating to municipalities, the municipal charter and ordinances, and the minutes of the council.

(2) A study of the fund structure of the city. The purpose and function of each fund and the restrictions and limitations surrounding its operations should be analyzed and related to its activities.

(3) A review of the nature and scope of the activities or functions performed by the city and the organization set up to carry out each function.

(4) A review of the accounting principles employed in accounting for the fiscal activities of each fund. The fairness and consistency with which these principles were applied during the year should be determined.

(5) A comprehensive review of the accounting documents and books of account. Consideration should be given to the adequacy of these documents and records and to the means for improving them.

(6) A survey of the system of internal control—to the extent that one exists. When an inadequate system is found, the matter should be brought to the attention of the council and provisions made to extend the details of the audit as required by the circumstances disclosed.

(7) An inspection of the insurance policies and fidelity bonds. The inspection should determine the adequacy of the coverage, the right of the insurer to do business in the state, and that the city is named in the policy or bond as beneficiary.

(8) A review of the provisions of the budget and the extent to which these pro-

<sup>1</sup> *Municipal Audit Procedures* (Chicago: The National Committee on Municipal Accounting, 1938).

visions have been complied with. Budget estimates and operating results should be compared and variations indicated.

(9) An analysis of revenue measures and of cash receipts records and procedures. The possible sources of cash receipts should be ascertained and the amount expected from each source compared with the revenue and cash records in order to determine, as near as possible, that receipts accruing to the city have been accounted for in the funds to which they belong. Also, depository transactions should be compared with the city records in an effort to detect such things as "lapping" and "kiting." The auditor should be alert to improvements that may be made in the control of the cash and cash items throughout the collection processes.

(10) An examination of expenditure and cash-disbursement documents and records. This examination in general should determine the purpose and legality of the expenditures; the fund or funds to which they were charged; and the accuracy and consistency with which they were classified. Expenditures in each fund should be reconciled with the budget estimates of that fund, and the procedure for the recruitment of personnel, for setting up salary schedules or pay bases, for making salary adjustments, and the procurement of supplies and equipment—all these should be analyzed in the light of legal requirements and coordinated with the examination of fund expenditures.

(11) An analysis of the asset and liability records and accounts of each fund. This analysis should ascertain the assets and liabilities of each fund and should determine whether or not they are clearly and accurately reflected in the accounts of the fund in accordance with accepted fund accounting principles. Since many cities are lax in accounting for noncash assets and current obligations, particular care should be exercised by the auditor throughout the

audit so that these items may be properly reflected on the fund balance sheet and operating statements.

(12) An appraisal of the methods of control and care of general fixed assets. A reasonable attempt should be made to determine that the assets belonging to the municipality are recorded in the accounts and that they are being used for city purposes exclusively. General fixed assets acquired through a revenue fund, if carried in the accounts of that fund, should be shown on the fund balance sheet in a way that will not confuse surplus represented by such assets with surplus represented by the current expendable assets of the fund.

(13) A study of the bonded debt. This study should determine the type and general characteristics of the bonds outstanding and should compare the amount of the debt with the debt-paying capacity of the unit. The amount of sinking-fund provisions to the date of the audit to retire the bonds at maturity should be compared with the sinking-fund requirements described in the bond indenture and in the city ordinances authorizing the sale of the bonds. The use of the bond proceeds likewise should be compared with the authority for the issuance and sale of the bonds.

(14) An analysis of the investments of each fund. Securities should be inspected to ascertain: (1) that they actually exist, (2) that they belong to the city, (3) that they were purchased in accordance with the provisions of the fund to which they belong, and (4) that they have been properly valued. The rate of earnings required by the governing provisions of the fund should be compared with the rate actually being earned on its investments.

(15) A brief of cash-depository agreements. The agreements should be analyzed and the adequacy of the surety deposit or bond of each depository should be studied and compared with governing legal provisions.

(16) An analysis of interfund transfers. Interfund transfers should be examined to determine that they were legally made and recorded in the funds affected in accordance with the authority and agreement by which they were made.

(17) An analysis of special-assessment-district funds. This analysis should determine the purpose and provisions of the fund and should see that the proceeds from both the sale of bonds and the assessment levied are used for the purpose described in the special-assessment authorization. Bond retirement and interest provisions made should be compared with the requirements of the assessment authorization and the bond indenture.

(18) A review of utility-fund operations. Care should be taken to see that the records of operations of municipally owned utilities are maintained separately from the general activities of the city. If the scope of the city audit includes utility funds, an examination separate from the audit of the general operating funds should be made. In general the procedures employed to examine the accounts of a municipally owned utility should be the same as those used in an audit of a privately owned utility.

(19) An examination of the municipal-ity's equity accounts in each fund. The fund balance and surplus accounts of each fund should be analyzed and the results shown on the balance sheet of the respective funds in such a way as to indicate clearly the limitations and restrictions on the balance or surplus of each fund.

(20) An audit report. The audit report should disclose the scope of the audit and should include summaries and comments on activities of each fund. Statements and schedules should be shown that reflect the financial status of each fund at the close of the fiscal year and the operating results for the year compared with budget estimates. The auditor should keep in mind that a

financial report of a city must be prepared by funds because of the restrictions and limitations surrounding each fund. Failure to recognize the fund structure of the city is a common fallacy in reports.

#### THE ENGAGEMENT

The development and statement of municipal audit standards will go a long way toward improving the quality of municipal audits. More is needed however than a general statement of standards if this quality is to rise to the level it should: there must be a complete understanding between the municipal officials and the independent auditor in each audit. The practice of deciding "to have an audit made" and then of selling these "decisions" to the lowest bidder must cease. The city council should select the auditor or the audit firm it wishes to engage and reach an oral or written agreement with him on the following significant points:

(1) The particular fund or funds to be audited.

(2) The kind of audit to be made and its general scope. It is recommended that in general the scope of the audit be no less in ambit than that outlined in *Bulletin No. 8* of the National Committee on Municipal Accounting.

(3) Provisions for extended examination where circumstances disclosed during the audit reveal the need for a detailed or a more extended investigation.

(4) An understanding of the responsibilities of the auditor in cases where officers or employees of the city are serving as officers or representatives of some other governmental unit.

(5) An understanding of the extent of the auditor's responsibility in connection with recommendations for the improvements of the accounting system and the system of internal check and control.

(6) The period to be covered and the extent of the examination, if any, to be made



of the account balances shown at the beginning of the period covered by the audit. This is important in those cases where the records have not been previously audited, or when the proposed audit period does not extend back to the close of the previous audit.

(7) The time the audit is to begin and the approximate time required to complete it.

(8) The working facilities to be provided the auditor by the municipality.

(9) A listing of the reports, statements, schedules, and forms that the auditor expects the municipal accountant and fiscal officer to furnish.

(10) The person or persons to whom the audit report is to be addressed and delivered.

(11) The number of copies of the report to be published and the method of publication.

(12) The basis for compensating the auditor for the service performed and for the payment of expense allowances.

(13) The terms of payment.

(14) The name of the auditor in charge of the work. It is not necessary to agree on the entire personnel to be assigned to the engagement, but an early agreement as to the audit supervisor usually adds to the smoothness with which the work of the audit progresses.

#### STEPS THAT MAY BE TAKEN TO IMPROVE MUNICIPAL AUDITS

Before closing this paper, it may be of interest to examine briefly the steps that may be taken to improve the quality of independent municipal auditing in a number of our states. The initiative to effect this improvement might well be assumed by the governmental finance officers and the public accountants of the state. Members of these two groups should work out a solution to the problem and then join hands in

securing the passage of legislation to make the solution effective.

Some state Societies of Certified Public Accountants have committees on governmental audits accounting which work with municipal and county officials in an effort to bring about a better understanding between the public accountant and the public official. This committee may be charged with the duty of studying and drafting minimum audit procedures designed to improve the quality of municipal and county audits. It may be that a joint committee of members of the Municipal Finance Officers Association and the state Society of Certified Public Accountants can best work together on the problem. Some of the specific points for a committee of this type to consider are:

(1) The drafting of a statement of audit standards and minimum requirements, or a statement of specific recommendations for adapting the general procedures set forth by the National Committee on Municipal Accounting to local laws and conditions.

(2) The drafting of a suggested standard contract to cover independent municipal and county engagements.

(3) A study of the fund structure of governmental units. The present fund structure in most governmental units is a great obstacle in the path of financial planning and a hindrance to the use of the best business principles and procedures in the management of governmental activities and services.

(4) A study of proposed legislation affecting local finance, accounting, auditing, and budgeting. This committee might well draft and propose legislation relating to these functions.

In this connection, I should like to state that I am opposed to the creation of a state agency to do municipal auditing; I strongly believe this field should be left to the public accountants of the state. I think the type



of state agency needed in this connection should have regulatory functions only. The organizations of municipal officers and the public accountants of the state should work together to secure the enactment of legislation creating an effective regulatory agency and assuring the appointment of a man trained and experienced in governmental accounting and finance to direct its

functions. The agency should prescribe, with the advice and consultation of an advisory board composed of public fiscal officers and public accountants, minimum standards for postauditing, budgeting, and accounting practices, systems, and reports. Finally, this agency should be given the authority and power to enforce such standard requirements.

## COST ANALYSIS OF A COST-PLUS CONTRACT

ARTHUR C. KELLEY

THE GREAT problem in the administration of the cost-plus contract program is the prevention of inflated and unnecessary costs. The fact that the government guarantees to reimburse the contractor for all necessary costs of performing the contract and in addition to pay a fixed fee, has often resulted in a let-down on the part of the contractor of his guard against high costs. "What difference does it make anyway, the government is paying for it." It is this attitude of mind which is injurious to the government and tends to vitiate and undermine the entire cost-plus contract program. How can this attitude of mind be changed so that the cost-plus contractor will make just as great an effort to reduce costs on a cost-plus contract as he would on a fixed price contract where the effort to decrease costs will be reflected in a larger private profit? The great merit of the competitive profit system of producing goods has been the fact that costs have been kept down as low as possible in order to increase the differential between selling price and cost—the net profit. The question now is: Can costs be controlled effectively when the incentive to personal profit is eliminated? This raises a very important question, because unless costs can be controlled and efficient production maintained

without the incentive of greater private profit, it is probable that the entire cost-plus contract program will finally collapse of its own wastefulness and inefficiency.

To be sure there is now a slight incentive to efficiency in many contracts in a clause that provides for an additional 1% fee to the contractor if his actual costs amount to less than the estimate. It is hardly probable, however, that this possible addition of 1% to the fixed fee will of itself be sufficient incentive to achieve efficient low cost production, because the advantages of inflating and padding costs may far overbalance the additional fee.

It is the purpose here to draw attention to the merits and disadvantages of the cost-plus contract and to consider what devices and means can be used to make this type of contract function more efficiently as a method of producing goods. For example, assume the government lets a contract for 200 airplanes of a certain improved type that has not been produced before. The first task is the engineering job of drawing the detailed designs and specifications from which the production program can be planned. If the estimated cost per airplane is \$100,000.00 and 20% spare parts are also required the total estimated cost, including spares, amounts to \$24,-

000,000.00 to which is added the fixed fee of 6%.

When the quantity and specifications have been agreed upon and the contract is signed the task is then one of organizing efficient production. Materials, supplies, tools, and equipment must be procured and production commenced. Since this is a cost-plus contract the government will require the contractor to have an accounting system which will show the correct costs of performing the contract. This may require certain changes in the accounting procedure if the cost system in use is not adequate to reflect the correct cost of manufacturing the airplanes. Once the cost system is properly designed and set up it will be possible to record and accumulate the costs of each contract as the work progresses. If the contractor is engaged wholly on government contracts total cost can be determined easily and the only difficulty is the correct allocation of costs between the various government contracts. However, if the contractor is engaged in part on government contracts and in part on commercial business the determination of government contract costs becomes more difficult because it involves the correct allocation of costs between government and commercial business.

The direct material and direct labor costs can be charged to the assigned work orders with substantial correctness, provided the system of accounting for these prime costs is properly designed, not too complicated, and is carefully carried out. To get accurate labor costs requires careful time-keeping for each worker and frequent checking of the time distribution. Direct material costs can likewise be obtained with substantial correctness if the perpetual materials inventory records are accurately kept both as to quantities and prices, for receipts and requisitions, and are frequently verified by physical count of the material. However, no system of ac-

counting for labor and materials will give correct costs unless it is carried on and continually checked by conscientious time-keepers and careful cost-keeping clerks.

The allocation of overhead expense is always an estimate based on some assumption and therefore is not likely to be as close to verifiable fact as the allocation of prime costs. The most commonly used methods of apportioning overhead expense to the contracts on the basis of direct labor hours or direct labor dollars are simple and workable, and in many cases result in reasonably fair approximations to the "true cost." It needs always to be borne in mind that the present stage of development of cost-accounting technique does not make possible the determination of the "true cost" of any such contract, but only the approximate cost, in accordance with the recognized and commonly used cost accounting procedures and assumptions.

If it be agreed then that costs of government contracts can be determined with approximate correctness the question remains as to the economic efficiency of this type of production. There is no doubt that the productive process is usually far more efficient under private competitive enterprise than under noncompetitive government control. The incentive to increase private profit by eliminating waste and inefficiency is generally a powerful stimulus to reduce costs. The record of American private enterprise during the past hundred years in reducing costs and lowering prices of its products to the consumers is ample proof of this statement, so far as free competitive enterprises are concerned.

In the case of monopolies the record is not so good, for the reason that the lack of a free market makes it possible for the monopoly to retard price reductions by the suppression of patents, limitation of output and other devices, and to continue to fix selling prices at a point that will yield the maximum profits rather than to reach

prices most favorable to consumers. These potential evils of monopoly are well recognized in this country and the numerous statutes, both Federal and state, attempting to control monopolies and their practices, are efforts to solve this problem. It need hardly be added that these efforts have often been unsuccessful in preventing high prices and unfair monopolistic profits.

The production of goods under a cost-plus contract bears a similarity to monopolistic production, since the free market is abolished and all costs are recovered from the government. If the cost-plus program, therefore, is to become a vital and successful part of the American economic system, ways and means must be found for injecting efficiency into this type of production. The spirit of indifference to high costs which too often prevails because the government pays for it all anyway, must be extirpated. Such an attitude held by the management or the employees will run up the costs to a grossly extravagant and wasteful amount.

The basic question is how to achieve efficient production without the incentive of larger private profits. Unless the answer to this question can be found the entire cost-plus contract program will eventually collapse because of its sheer inefficiency and wastefulness. The question here is of far greater significance than a solution merely to a temporary war program problem for basically it involves the success or failure of a planned economy. When this war is ended and the attempt is made to restore in this country a peace-time economy of production for popular needs, it is probable, for various reasons, that the traditional capitalistic regime of production for private profit, will be unequal to the task of bringing about full-time production and full employment, without at least a considerable portion of the national production being operated on the basis of a planned economy—either directly by the govern-

ment or indirectly by means of extensive government contracts. It now appears that the only hope of averting a disastrous postwar depression is by the prompt organization of a segment of the national economy on a government planned basis, and this segment must be sufficiently large to take up the slack in private industry which is bound to come when the war stimulus is ended. It is to be hoped that any scheme of planned economy that may be devised to take care of the postwar problem will be based on government contracts rather than on government ownership and operation, for government ownership and operation can be notoriously inefficient and wasteful as compared to private operation. The waste and inefficiency in carrying on the vast Federal Government and many state and municipal governments are well known.

If this statement is correct as to the part the government will play in the future national economy it follows that the government-contract program must be placed on an efficient basis and controls must be set up to prevent waste and extravagance, especially in the administration of the cost-plus contract and its variants. This requires that there be developed and applied cost standards by which the record of any contractor may be judged and rated. Until such standards are established and used rigorously, costs are likely to become exorbitant and extravagant.

The next step, therefore, which the government should take in the administration of the cost-plus-contract program is the formulation of standards and comparative cost data by means of which the achievement of any contractor may be measured and rated. If the record of any particular contractor reveals that his costs of manufacturing the product are out of line and grossly in excess of the standard set up, the government should inform him that further contracts will not be awarded. Such a threat not to award further contracts

would no doubt be a powerful means of stimulating the contractor to strive for efficiency—probably just as effective as the incentive for private profit. Of course under war conditions now prevailing the government cannot follow such a policy. Production must be obtained immediately in vast quantities regardless of costs. But after the war is ended further contracts should then be awarded only on the basis of efficiency and quality.

However, before any valid judgment can be given as to the efficiency rating of a contractor it will be necessary to formulate cost standards, such as for example, the square foot of floor area in construction projects, the completed airplane cost, and the cost per pound for different types of aircraft. To be of use in controlling costs the standards must be broken down into the various cost elements, and the cost data, furnished by the various contractors, must be comparable. This means that the classification of the cost accounts must be similar and uniform treatment of cost elements must be followed. Such a uniform procedure of assembling and reporting costs is a necessary condition to the establishment and application of cost standards. For some types of products the formulation of uniform cost standards will not be

an easy task, but it is not beyond solution, and a beginning in this direction has already been made for certain industries, such as the aircraft industry where costs are now reported on government cost-plus contracts in conformity with the regulations of the United States Government, expressed in T. D. 5000 and other rulings.

The sort of cost analysis that can be compiled for an aircraft contract is illustrated in the cost statement which follows. This is a hypothetical statement based on an assumed cost-plus government contract calling for the manufacture of 200 flying-boat patrol bombers. The general specifications of the ships are assumed to be as follows:

Powered by two 1200 h.p. Pratt & Whitney engines  
Weight empty—16,000 lbs.  
Maximum speed 200 m.p.h. Minimum speed 75 m.p.h.  
Bomb load capacity 6,000 lbs.  
Cruising range 4,000 miles  
Service ceiling 21,000 ft.  
Estimated cost per ship \$100,000; spare parts, 20% or \$20,000; total, \$120,000  
Total estimated cost \$24,000,000 plus a fixed fee of 6% or \$1,440,000

The costs of such a contract may be broken down as shown by the following hypothetical cost statement:

COST ANALYSIS OF A COST-PLUS CONTRACT FOR 200 FLYING BOAT PATROL BOMBERS  
PLUS 20% SPARE PARTS

Estimated Cost per airplane with spares.....	\$	120,000
Estimated Total Cost \$24,000,000—Fixed Fee—6%.....		1,440,000
<i>Development Costs</i>		
Design Data and Drawings.....	\$	50,000
Tests and Experimental Data.....		25,000
Special Tools, Jigs and Fixtures.....		425,000
Total Development Expense Prior to Production.....		500,000
<i>Production Costs</i>		
Direct Productive Labor.....		6,500,000
Direct Tooling Labor.....		1,000,000
Direct Production Materials.....		7,000,000
Direct Tooling Materials.....		500,000
Direct Engineering Labor.....		150,000
Direct Misc. Factory Expense.....		150,000
Total Direct Factory Cost.....		15,300,000



Indirect Labor.....	2,050,000	
Indirect Materials and Supplies.....	800,000	
Service Expenses—Ht. Lt. Power.....	1,400,000	
Fixed Charges—Depr., etc.....	2,800,000	
Indirect Misc. Factory Expenses.....	150,000	
Total Factory Overhead.....		7,200,000
Total Manufacturing Cost.....		23,000,000
Misc. Direct Expenses (not mfg. costs).....	500,000	
General Expenses.....	300,000	
Indirect Engineering Expense (labor, material and expense).....	400,000	
Distribution, Servicing and Administration Expenses.....	1,300,000	
Total General and Administrative Expense.....		2,500,000
Total Cost of Contract.....		\$25,500,000
Fixed Fee.....		1,440,000
Total Contract Price.....		26,940,000
Amount Paid by Government for 200 Airplanes plus 20% spares. Price per Airplane including spares.....		134,700
Price per pound (empty) \$7.01		
Price per airplane \$112,250		

A cost analysis of this type is very significant and if similar analyses are obtained from other manufacturers of aircraft holding government contracts, valuable comparisons can be made and cost standards can then be set up by which the efficiency of any contractor can be measured. For example, if the government awarded a similar contract for flying boats plus 20% spares to the Martin Aircraft Corporation, the comparative costs of the two contracts, as revealed by such a cost analysis statement, would be highly informative and helpful not only to the government but also to the two manufacturing plants themselves in their efforts to reduce costs.

At present the government has let immense contracts to the Boeing Aircraft Company for the construction of the famous "Flying Fortress" bombers and to the Consolidated Aircraft Corporation for the equally famous "Liberator" bomber. These two army bombers are similar in many ways. If comparative cost analyses are made of the construction of these two heavy bombers, similar to the cost analysis

above illustrated, the cost data revealed would be highly informative and helpful to both the government and to the two aircraft corporations, and would aid materially in the formulation of standards for measuring and controlling manufacturing costs. Unless standards of achievement of this type are eventually established the government will be groping in the dark and will not be able to determine whether or not fair value has been received.

In the cost statement illustrated, it was assumed that the contract was completed. The question will now be considered as to the possibility of determining costs of airplanes produced before the completion of the contract. This will be a far more difficult problem to solve because it involves the evaluation of work-in-process inventories, always a troublesome task and exceptionally difficult in an aircraft factory. The major difficulties are worth mentioning.

To arrive at the cost of the finished aircraft the cost of all unfinished products that are passing through the factory in varying stages of completion must be de-



ducted. There are thousands of parts that go to make up a completed large airplane and as these parts are fabricated from the raw materials, direct labor is applied and overhead expense is incurred. In order to arrive at any reasonably close approximation to the cost of the unfinished aircraft, the following steps must be taken:

Separate work-in-process summaries are set up for each department and as the work progresses from one department operation to the next and emerges into the subassemblies and lastly into the final assemblies, the costs of parts, materials, labor, and overhead are accumulated along the way, from one department to the next, until the total cost of the finished aircraft finally emerges. The accounting procedures and cost records required for this subdivision and accumulation of costs are detailed and complex, and require a carefully designed system of cost records and efficient cost clerks, timekeepers and accountants.

At the cut-off date when costs are to be determined in addition to the accumulation of cost figures it is also necessary to estimate the stage of completion of the unfinished product, in order to arrive at the estimated cost of equivalent completed units. For example, in the hull assembly department there may be 80 hulls in process of assembly ranging from those just begun with the keel and ribs in place to those almost completed. The stage of completion for every one of these 80 ships must be estimated and expressed in a percentage. These percentages are then totaled and an average computed which will represent the stage of completion for the 80 hulls as a unit. If the average stage of completion is 60%, this percentage will then be applied to the total cost accumulated in the hull department in order to arrive at the estimated cost of completed hulls. Assuming total accumulated costs in the department of \$1,020,000 for the period and 20 hulls have been completed during the

period the cost of the finished hulls and work-in-process for the department may be estimated as follows:

60% of 80 equals	48 equivalent completed units
	20 completed units
	<u>68 total equivalent units</u>
\$1,020,000 divided by 68 equals	\$15,000, the average cost of one completed hull.

The accuracy of the estimated cost of the finished hull will depend on the reliability of the estimate made as to the degree of completion attained by each hull. The evaluation of the work-in-process for the hull department is not impossible, but in other departments the problem is far more difficult. Consider such a department as miscellaneous parts where hundreds of various small parts and pieces are being worked on by hand and by various types of machine tools. The determination of the amount of labor, materials, and overhead expended on these hundreds of unfinished parts is indeed a most difficult, if not impossible, problem to solve, and any inventory valuation arrived at is usually only a rough estimate.

It is evident there are many chances for error in estimating the cost of unfinished work-in-process, and the efficiency of the cost system and the accountants and clerks who are using it, must be high, if reliable and trustworthy costs are to be attained. The technical difficulties and complexities of designing and operating a cost system that will yield reliable costs of work-in-process for aircraft manufacturing are so numerous and the industry itself is so young and has been working under such pressure that probably no aircraft manufacturing concern in the country at present is able to furnish reliable cost figures until their contracts have been completed.

For the present, therefore, the government must wait until contract completion before attempting to arrive at accurate unit costs. Even the computation of unit costs of a completed contract is difficult

where spares are included, because of the problem involved of proportioning the total cost of the contract equitably between the spare parts and the completed planes. Unless the cost of spare parts is accumulated on a separate work order, the proration of the total cost of the contract between the spares and the completed units is only an estimate.

The general conclusion to be drawn is that the problems involved in the cost analysis of a cost-plus contract are difficult of solution. No satisfactory solution to some of these problems has as yet been worked out, but the task of determining correct unit costs offers an interesting chal-

lenge to the abilities of cost accountants. As time goes on, more of the obstacles to better cost-finding will no doubt be overcome, so that the cost inspection staff of the government, with the coöperation of the contractor's staff of accountants, will evolve procedures that will permit the determination of unit-cost analyses for not only finished contracts but perhaps also for contracts in progress. The government cost-inspection service will then be able to formulate cost standards for various types of products, by which the efficiency of the manufacturing organizations can be judged and rated.

## EARNING-POWER VALUATION OF INVENTORY

LAWRENCE L. VANCE

IT WILL BE the object of this paper briefly to review some of the more serious criticisms of cost valuation of inventory, to formulate a concept which might be considered an "earning power" valuation, and to criticize the latter from conceptual, statistical and psychological points of view.

### CRITICISMS OF COST VALUATION

The system of income reporting which identifies costs with units of product and matches the cost of individual units with revenues resulting from sale of the units has been said to rest upon an analogy between the determination of the ultimate profit for an enterprise and the periodic computation of income.<sup>1</sup> Since ultimate dollar profit is the difference between all invested costs and receipts, periodic income is said to be justifiably computed as the resultant of deducting the costs of

units disposed of during the period from the related revenues. The analogy is false, however, since the prime problem in periodic income computation—the treatment of values that bridge the gap between periods—is not present in the final liquidation. The method is on more secure footing when it is contended that the final income figure is merely a summation of the income from individual transactions, and that such of the latter as are complete in any period may be summarized to give the income of the period. This appears to be the position of Paton and Littleton.<sup>2</sup>

There are two elements of compromise in the position taken by the unit cost advocates in practice. First, it appears to be logically impossible to allocate all costs to the flow of physical product. Suggestions for treating distribution and administration costs as inventories and for writing them off upon some predetermined rela-

<sup>1</sup> Carl Thomas Devine, *Inventory Valuation and Periodic Income* (New York: The Ronald Press Company, 1942), p. 48.

<sup>2</sup> W. A. Paton and A. C. Littleton, *An Introduction to Corporate Accounting Standards* (Chicago: American Accounting Association, 1940), Ch. V.

tionship to sales were made by Castenholz, and by Paton in 1927.<sup>3</sup> In spite of the schematic attractiveness of the idea, Paton later abandoned it.<sup>4</sup> Secondly, it has not been considered feasible to ignore certain obvious losses of revenue producing capacity in the assets, in spite of the fact that they may not have reached the period of actual liquidation. Proponents of the "thoroughgoing" cost method recognize this and make partial allowance for it. Since these compromises are made the door is left open for further adjustment of the concept of "acceptable" accounting procedure. It is difficult to see why a recognizable loss of usefulness, or "earning power," in the case of obsolescence, which is admitted by cost adherents, should be treated differently from a loss of sales value through a change in demand. Merchandise has only one quality significant to accounting: the power to bring in revenue. The doctrine would be on firmer ground if it proposed to match costs and revenues as related by identification of costs with units of product in all ordinary cases, but to record as losses all recognizable expirations of the effectiveness of cost inputs.

In attempting to meet this criticism Littleton made the following statement: "The fact of lower realizable value is less significant than the *cause* for expecting a loss to occur."<sup>5</sup> Therefore, if the loss is from obsolescence, we recognize it; if it is from market action we ignore it. Aside from the arbitrariness of this argument, it is inter-

esting to follow it to its logical conclusion, which is, that an investor is not so much concerned about the fact that he has lost \$1,000, as in the cause for the loss. At least the investor in this case is objective.

The foregoing considerations are apropos of schematics. Accounting has other and perhaps more pressing standards to meet. One of them is the validity of the statistical method embodied in any procedure. The advocates of strict cost valuation of inventories are well justified in emphasizing the need for "objective, verifiable" evidence. At the point where they are criticized for inconsistency, that is, in recognizing loss of earning power as a result of obsolescence before the sales event, while ignoring it when it results from other causes, they may be challenged also on the score of objectivity.

The criticism here is that obsolescence cannot be observed with more objectivity than other declines in value. In answering this criticism Littleton has made the following statement: "Evidence of goods obsolescence can be (1) conclusive (substitute goods available and actually being taken by customers in preference to our goods), (2) persuasive (mere presence of goods that could be used as substitutes), (3) inadequate (opinion that substitute may soon appear, or that goods now available may presently fall from popular favor)."<sup>6</sup> His ensuing sentence specifies removal from inventory for (1) and creation of a reserve for (2). The usefulness and objectivity of these tests will be apparent from an experience of the writer. Shortly after the electric razor was introduced the writer met a friend who was an executive of a concern manufacturing shaving cream. This individual bore all the expressions of worry and depression. "Substitute goods" were "available" for his product and were widely "being taken;" it looked as though his inventory and a major product line were obsolete.

<sup>3</sup> W. B. Castenholz, "The Proper Treatment of Distribution Costs," *ACCOUNTING REVIEW*, II: 25-27, March, 1927, and W. A. Paton, "Distribution Costs and Inventory Values," *ACCOUNTING REVIEW*, II: 246-253, September, 1927.

<sup>4</sup> Paton says in this connection: "It is not practicable to force the entire mass of operating charges through the cost-of-goods funnel, with periodic division into inventory balances and cost of sales. Many of the so-called overhead costs have no definite, ascertainable relation to the flow of goods, and purely arbitrary assignments should not be encouraged." W. P. Paton, *Advanced Accounting* (New York: The Macmillan Company, 1941), p. 119.

<sup>5</sup> A. C. Littleton, "Questions on Accounting Standards," *ACCOUNTING REVIEW*, XVI: 338 December, 1941.

<sup>6</sup> A. C. Littleton, *ibid.*, p. 338.

Ten months later a second meeting took place; this time the shaving cream manufacturer was the picture of buoyant optimism. He has discovered that electric razors were affecting the sale of shaving cream relatively little, and he said that if only the great masses of men in this country who cling to the old shaving brush and soap could be persuaded to dispense with those articles, all the other caterers to this sartorial need would profit immensely.

It is clear that obsolescence is not a clear cut and readily distinguishable phenomenon. It proceeds by slow stages; it appears among different sections of the people at different times. For a silk hosiery mill, last year's exotic "tanbark" shade may give way in the style centers to this year's "brick dust," but stocks of "tanbark" may nevertheless be sold at good prices in some areas. Examples could be multiplied, but enough has been said to indicate that the accountant has only one valid and objective piece of evidence on obsolescence short of actual sale or conversion of an article, and that is the selling price at which the possessor holds it out to the public. The availability of this evidence for other valuation purposes will be considered below.

#### "EARNING-POWER" VALUATION

The divorce of cause and effect in the operating statement through cost valuation of inventory is most readily seen in the case of a merchant who is forced to cut prices to move stocks—regardless of whether the action is a matter of normal inventory clearance or an adjustment to changed market conditions. It is here asserted that the reporting would be improved if the effect of the price cut could be reflected in the income of the period in which the determining forces operated. The same statement applies to a price rise.

We may define earning power in general

as the capacity to bring in revenue, and for the purposes of this paper we may define it as the excess of selling price over book value—a "gross margin." We may then proceed to investigate the possibilities of its application to inventory valuation. Replacement costs have been advanced for this function in the past, but they stand effectively indicted by two lines of argument; they do not necessarily indicate the potentialities of the particular firm, and while they may set up a prospect of actual changes in price and revenue they are by no means conclusive evidence that such will befall. The first of these indictments is well illustrated by large numbers of manufacturing enterprises which buy materials on a fluctuating market and sell a branded product on a relatively stable price structure. To say that changes in the replacement prices of materials in the inventories in such cases where no change in selling price has occurred should be substituted for costs is to substitute an accounting for opportunity costs for an accounting for sunk costs at this point. In the words of Hatfield, "An argument in favor of inventorying merchandise at its market value is that only by so doing can the operations of each year be properly judged."<sup>7</sup> With this the writer is not presently concerned; it will be his position that another reporting can be devised to reflect forces actually impinging on the particular firm prior to actual sale.

It seems evident that, aside from the question of opportunities not taken,<sup>8</sup> an accounting for income determining forces before the point of sale must depend on the revenue to be derived from any lot of inventory. This has been advanced by Canning as the basis of inventory valuation.<sup>9</sup>

<sup>7</sup> Henry Rand Hatfield, *Accounting* (New York: D. Appleton-Century Co., Inc., 1927), p. 102.

<sup>8</sup> The use of opportunity cost data is complicated by the fact that a certain amount of stock-carrying is not avoidable.

<sup>9</sup> John B. Canning, *The Economics of Accountancy* (New York: The Ronald Press Co., 1929), pp. 220 ff.



The proposal has the obvious merit of being restricted to the actual conditions existing within the area of the affairs of the particular firm. Canning suggests a computation as follows: "The carrying value price might be determined in a number of ways. The one suggested here is to multiply each unit selling price by a fixed constant,  $k$ . This constant is determined as follows. (1) Standard ratios to sales (preferably averages of the concern's own experience) should be found for loss on bad debts, selling expenses, and general expenses including costs of collection (but not interest paid or other distribution items like income taxes). (2) Some normal industrial rate of return converted to an average rate on the concern's own inventories should be found. The constant which is to be multiplied into each selling price then becomes one minus the sum of the rate allowances for subsequent expenses and for a normal profit on the inventory."<sup>10</sup>

The specific computation suggested by Canning is subject to serious objection on the score of circularity of reasoning. By including a deduction for "normal" profit it begs the question of the computation of a residual income in the second period. It allocates a "normal" return to the second period, although there is no reason to believe that income determining forces operating in the second period allow such a return. It would permit changes in inventory value from cost where no change in either selling prices or replacement cost had occurred since acquisition of the inventory.<sup>11</sup> To say that there was a difference in income determining forces between the two periods as far as acquisition and disposal of the inventory is concerned in the latter case seems to be clearly wrong.

If we are to measure the effect of the income determining forces in terms of a

"gross margin" we need objective indexes of changes in the margin. Our first proposition is that no change in earning power occurs unless there is a change in selling price.<sup>12</sup> The required data are available in the quoted prices of each enterprise if not in its actual current sales transactions. If selling prices change between date of acquisition and the closing date we have indisputable evidence of a change in the "earning power" of the inventory as computed on cost.

The second proposition is that, *once a change in earning power has been evidenced by a change in selling price*, we may make a reasonable allocation of "margin" by valuing the inventory to yield the current rate of margin on reacquisition<sup>13</sup> cost in the succeeding period. The computation of the rate of margin to be applied to sales must be defined as the rate on current acquisition costs for goods equivalent in normal trading function. This is necessary to provide for valuation of goods which would not be identically replaced, such as a specific color in a style good and for clearance inventories that exist because of the vagaries of public taste, and will be replaced with similar goods which will sell on the regular price basis. It will be observed that no adjustment of inventory will result unless there is also a change in reacquisition cost as against original cost, since the "current" margin is computed as the rate on selling price of the difference between selling price and reacquisition cost.

The method must be formulated to include one more limitation, namely, that either divergent or convergent movements of selling and reacquisition prices should give rise to no adjustments in inventory. This must be done, to repeat, since it is not the objective of the method to make an

<sup>10</sup> That this falls short of an accounting for opportunity costs will be obvious.

<sup>11</sup> The term "reacquisition" cost is used to avoid those connotations of "replacement" cost which are not appropriate to this position.

<sup>12</sup> John B. Canning, *ibid.*, p. 222.

<sup>13</sup> Where the rate of margin was different from the "normal" rate.



accounting for opportunity costs but to follow changes in selling prices through to a reasonable reflection of such changes upon inventory valuations and hence upon periodic income. Where sales prices fall and cost prices rise it is not possible to say that the earning power of the inventory has risen, which an opportunity cost valuation would appear to indicate, and the converse is true in case of a divergent movement of prices. The objective of the method here is to meet the needs of the typical case, in which the whole structure of acquisition and selling prices moves in one direction in response to broad external forces. This, it must be remembered, is the typical case, and the recital of exclusions from the method limits its application less than the length of the recitation suggests.

The application of the method may be noted for some general cases. Where there is no change in selling price there is no adjustment. Similarly, where there is no change in the reacquisition price there is no adjustment, since the change in sales price merely establishes a new "current" margin. Thus the operations of a manufacturer whose selling prices are stable and whose material prices are fluctuating would reflect margins realized in sales. A producer obtaining supplies at constant cost and catering to a market experiencing fluctuating prices would be similarly free of inventory adjustments. Where the whole price structure moved upward, however, even though the rate of margin based on current sales and acquisition prices remained constant, there would be an adjustment to avoid the "windfall" which would appear in the second period if inventory should be valued at cost. This provides, furthermore, for changes in margin rates (measured on reacquisition cost) which must be reflected if a realistic division of the effects of income-determining forces are to be segregated by periods as

well as they may be. The method serves the purposes of clearance stock valuation by allowing a succeeding period's operations to show a return on marked-down goods unaffected by the stock needs or purchasing errors of the prior period, in which case it may be said that only the operational influences of the second period are reflected in its statements. Similarly its beginning inventory may be said to have an "earning power valuation."<sup>14</sup>

#### CRITICISM AND RATIONALIZATION

It is at once apparent that it may be said that the proposed method merely shifts from cost to replacement cost when a certain circumstance arises—that is, when both selling price and acquisition cost move from their positions at the date of original acquisition. It may be contended, however, that this is of arithmetical significance alone, and that we can distinguish between the use of replacement costs as a measure of an observed earning power change and their use as the *criterion* of a change. For those to whom this answer is not conceptually satisfying, we may point out that the method at the least would offer an objective means of determining when replacement costs are appropriately admitted to the operating statement. To the reply that such a procedure is "inconsistent" we may add the rebuttal that one method, however defined, will be a consistent procedure as long as all its terms are observed, and that to attempt to separate a method into two parts and to charge conflict between the parts is to beg the question.

This brings to mind the similar criticism of the cost-or-market rule which has been widely advanced. The rule is not illogical,

<sup>14</sup> The writer is aware that the results of any period are a complex of influences including the pervading influence of the original decision to launch the enterprise, but he rests upon the above as a means of improving the segregation of income into periods as far as the inventory is a factor in the allocations.

but is merely the resultant of two principles—one, that losses should be recognized when evidence of impending realization exists, and two, that no gains should be recognized except as they arise from sales. For anyone who supports those principles the cost-or-market rule is basically logical.<sup>18</sup> It may be effectively criticized on other grounds, however, including the assumption that market prices measure the forces actually encountered by the particular firm in all cases, and for ignoring equally—or more obvious—gains.

This brings us to the obvious and popular criticism of any method of valuation which proposes to recognize upward value changes, as the writer's method does when compared with the identified unit cost concept—namely, that such procedure is not conservative. In this connection we may note that it is not the function of the accountant to be conservative, but to be accurate. The damage to investors done through conservatism has been pointed out by Werntz and others.

Several answers to the criticisms of upward value revisions may be formulated. First, one may take the point of view that inventories represent a pool of costs in which individual units are not distinguishable and contend that the pool should be divided for inventory purposes in such a way as to reflect the revenue which can be obtained from it in the two periods affected at any one inventory date. This would leave value adjustments strictly in the field of apportionments of cost, and not in any sense an anticipation of profit—the latter could be contended only upon the basis of a cost established by the identification of costs with individual physical units of product, which clearly begs the question.

Secondly, it might be argued that we may retain the procedure of unit cost

identification and recognize that it is appropriate in an income accounting which brings cause and effect together only in instances where acquisition and sale occur in the same period, and that supplementary procedure is required to account for inventories. In this case the two elements—costs expired through sales and inventory adjustments—could easily be distinguished in the income statement. It is to be noted that such an adjustment would be *exactly* equivalent to the adjustments for estimated bad debts and obsolescence of stocks which now go unchallenged. To the contention that the proposal merely shifts "income" from one period to another we may reply that this statement begs the question by assuming "income" to be that computed from identified unit costs, and further that the contention might as appropriately be applied to the adjustments for bad debt estimates and inventory obsolescence write downs, which evidently have the purpose, as used by strict cost advocates, of "shifting" "income" from the period in which realized by sale or otherwise to the period in which the determining events occurred. This answer also applies to the contention that in periods during which a change is made from an advancing to a declining price trend there may be units upon which a value increase and a subsequent decrease are recorded, in which case income may be increased, and taxed, in one period and decreased in the second one in which the deduction is useless for tax purposes.

This latter objection is minor in view of the fact that deviations from the basis used in the tax returns are common in practice, and may be availed of for tax purposes if inventory revaluations are used—in fact, the inadequacy of tax regulations for general accounting usages are too well known to require comment. The argument, properly oriented with respect to the conceptions of income involved, says in substance

<sup>18</sup> This has been observed by Devine. See Carl Thomas Devine, *Inventory Valuation and Periodic Income* (New York: The Ronald Press Company, 1942), pp. 81-82.

that if taxes were paid on the income determined with "earning power" valuation of inventory, it might happen that cases would arise in which less would have been paid if cost valuation had been used. To the extent that value decreases are recognized while net income is still available to absorb deductions (a result of earlier recognition of deductions) the tables would be turned. The probabilities are not in this direction, however.

Regardless of which of the above points of view one takes it may be pointed out that all conventional accounting "anticipates" profits. We "anticipate" that accounts receivable will be collected (our bad debt estimates notwithstanding); we "anticipate" that our fixed assets will be recovered in sales, and we "anticipate" the same for our inventory and prepaid expenses—in fact, for every item on the asset side of the balance sheet except cash—if this were not so, we could not compute a profit while we still had convertible assets. That this is not merely an academic sleight-of-hand may be shown by reference to Paton, who, in his Dickinson lectures, indicated that a cash collection basis for revenue accounting might be considered preferable to the conventional sales basis.<sup>16</sup> The same purpose is served by reference to Fagerberg, who visualizes the typical asset apportionment method of accounting as seriously deficient for exhibiting the affairs of a mining venture in which the extent of the ore and the cost of extraction are vague and the risks in general are high.<sup>17</sup> The references given attack the typical method as going too far in the

recognition of income; they are offered merely to indicate that the question need not be considered finally determined. The issue turns on the nature of the evidence to be admitted as a basis for computing income; it may well be considered, if accounting is to become a finer instrument, whether an increase in sales price by a going concern may not be taken as a means of measuring income in the period witnessing the event.

To the contentions of those who would bring the income figure as nearly as possible to "disposable" cash we may suggest that they either advance to the position of the last-in first-out advocates, who point out that income which has to be reinvested in a swelling inventory (if the concern is to continue on the same level of activity in a rising price structure) is not "disposable" for any other purpose, or, that they retreat to the cash collections basis for reporting income. Individual circumstances may in a specific case require either of these methods, but their merits are not the present concern of this writer.

With respect to statistical considerations it may be noted that the measure of income determining forces is far from ideal. The influences likely to raise or lower a selling price or to move the whole structure of acquisition and selling prices may be at work and quite apparent some time before a change in sales price occurs. Since accounting must rely on objective evidence, however, the method is proposed as a step toward better reporting, and not as a definition of the ultimate truth about income. Both sales of identical or functionally identical goods currently made, and sales prices quoted, are objective and verifiable.

Some specific questions related to the computation of an "earning power" valuation in practice are appropriate to the discussion. The ideal computation would proceed upon the basis of individual in-

<sup>16</sup> W. A. Paton, *Recent and Prospective Developments in Accounting Theory* (Boston: Harvard University Graduate School of Business Administration, Business Research Studies, No. 25), p. 6.

<sup>17</sup> Dixon Fagerberg, Jr. "Depletion: The Pivotal Problem of Nonferrous Metal Mine Accounting," paper presented at the Mountain States Accounting Conference, Denver, Colorado, May 22, 1941. Reprinted in *The Journal of Accountancy*, LXXII: 229-234, September, 1941, (without charts), and in *Pathfinder Service Bulletin*, No. 156 December, 1941.

voice lots or production order lots. This adds only the consideration of sales prices in effect at acquisition and at closing date to the procedure necessary for a thorough-going cost-or-market valuation, and a computation of reacquisition costs will be further added to the procedure required for a cost valuation. This latter should be a computation based on the general cost accounting procedure of the firm in existence at the closing date, since it is intended to be used only as a *measure* of an observed change in earning power of costs recently incurred, and not as a *criterion* of a change nor as a means of substituting opportunity for sunk costs in general.

With respect to the question of displaying such adjustments as have been suggested in the statements, we can offer nothing more complete—or appropriate to the needs of all users of the statements—than Canning's recommended form. His form might be condensed by showing the inventory adjustments in one figure, even to the extent of showing them combined for the beginning and ending inventories in the profit and loss statement, if desired. Canning's caption on carrying value would have to be shortened by omitting "estimated to yield  $x\%$  net on sales" if we followed the suggestions made earlier. His balance sheet form, with the last alteration applied, is as follows:<sup>18</sup>

Finished goods inventory at cost.....	\$125,000
Add excesses of carrying value over cost.....	1,000
	<hr/> 126,000
Less excesses of cost over carrying value.....	8,000
	<hr/>
Carrying value.....	<u>\$118,000</u>

The following is suggested as a possible income statement display—it represents a condensed version:

<sup>18</sup> John B. Canning, *op. cit.*, p. 223.

Sales.....	\$500,000
Merchandise costs:	
Beginning inventory at cost.....	\$120,000
Purchases.....	300,000
	<hr/> 420,000
Less ending inventory at cost.....	125,000
	<hr/>
Cost of goods sold.....	295,000
Less adjustments of inventories to carrying value.....	10,000
	<hr/>
Gross margin earned in 1942.....	<u>\$215,000</u>

A final practical consideration arises with the possibility that a slight change in sales price may be made with the intent of justifying a considerable adjustment of inventory. This may be met, if mechanical procedures are insisted upon, by specifying a minimum per cent of change before adjustments are to be allowed; it may well be considered, however, whether the question "is this adjustment bona fide?" be left to the public accountant, and his certification taken as the basis for acceptance of an adjustment. While reliance upon individual judgments may have dangers, rigid mechanical procedures carry dangers of their own and their use may deny to investors the most valuable services the accountant is capable of rendering.

Psychological influences of accounting data have recently become the concern of economists and others who observe the intensifying effect of certain accounting procedures upon the periodic reporting of profits. It is contended that the violent swings of profits spread optimism when prices rise and gloom when prices fall, and that investment is increased when it might better be restrained and restrained when it should be stimulated. These broad social considerations are sometimes looked upon by accountants as outside their province; they prefer to state the "truth" and to avoid "manipulating" the



statements for particular ends. It is difficult to define the "truth," however, and particularly so in accounting. It may well be defined in terms of objectives, and if this is done the psychological effects of accounting procedures may be a determinant of accounting policy. From such sources arise the strength of the advocates of last-in-first-out.

The writer is aware that the valuation methods proposed here have the effect of increasing reported income in times of price rises and of decreasing it in times of price declines, as compared with a method based on cost valuations of inventory alone. In so far as this consideration is governing the method is not to be recommended.

We may accordingly conclude on themes expressed by May and by Devine: "... an income account may be designed to show what income has been realized in a given period or what was the earning

capacity of the business under the conditions existing during the period . . . and is more frequently, something in the nature of a compromise between the two."<sup>19</sup> "In light of these numerous alternatives it is possible that one (and only one) of them yields the 'true' profit and all others lead to false income figures? The naïveté of such a rigid position is obvious."<sup>20</sup> And finally, may we add that the foregoing material has been presented in the spirit suggested by Littleton's remark in connection with inventory valuation: "Instead of sounding like unimportant hair-splitting, I hope that it may sound like an invitation for accountants to demonstrate to a critical public that accounting can refine its techniques."<sup>21</sup>

<sup>19</sup> George O. May, "Improvement in Financial Accounts," *The Journal of Accountancy*, LXIII: 346, May, 1937.

<sup>20</sup> Carl Thomas Devine, *op. cit.*, p. 47.

<sup>21</sup> A. C. Littleton, *op. cit.*, p. 337.

## SOME PROBLEMS OF LAST-IN-FIRST-OUT ACCOUNTING

ALBION R. DAVIS

THIS PAPER is not a sales talk for the last-in-first-out method of inventory valuation. I believe that rationalized or stabilized inventory valuation is today a *fait accompli*, and although it has admittedly only limited application, it has—where its fitness is definitely indicated and where its technique has been realistically developed and oriented to local conditions—stood the test of time and proved its practical usefulness. It has been endorsed, through adoption, by individual companies and by industries as a whole; it has been sanctioned by highly accredited members of the public-accounting profession; it has been approved by ranking business educators; it has been accepted by regulatory bodies devoted to protecting the public

interest; and it has been recognized and authorized by Federal statute as suitable for determining taxable earnings.

It is my effort here to provide a simple and workable method for applying last-in-first-out, as permitted under the internal Revenue Code, to composite inventories—inventories of a so-called integral category. To outline this method it is first necessary to explore the principles involved and determine the probable permissive limits of its application. The word probable is used advisedly since at least the *prima-facie* determination in each instance will be made by the Bureau of Internal Revenue when it examines individual tax returns.

It must be recognized that accounting for inventories on either a physical or a



value basis is not and never can be an exact science. Quantities and values are often no more than approximations or estimates. Regardless of the accounting method used, human judgment is a vital factor in the final results. As between different companies the variation traceable to this human factor always has been, and always will be wide. In any one company, however, consistency reduces this variation over a period of time to an acceptable working limit and the resultant yearly income is sufficiently accurate. Much of the discussion and argument regarding the application of last-in-first-out, particularly for tax purposes, arises from a failure to recognize this fact. Consistency of policy relating to inventory valuations within the individual company will still continue to be an important criterion of acceptability to the Treasury Department. Uniformity in detail between different companies in their treatment of inventories is not so necessary. The last-in-first-out amendment is no more of a strait-jacket than the income-tax law itself.

Another unfortunate source of discussion and argument regarding the last-in-first-out amendment is a tendency, on the part of many, to limit its meaning to an arbitrary, literal interpretation of the text of the act and the regulations, without any concern for their foundation or background. The ruling (I.T. 3456) of the Bureau of Internal Revenue says in connection with last-in-first-out, "in order more clearly to understand the provisions prescribed by the regulations (T.D. 4959) it is important that the general purpose or legislative scheme of the Act be borne in mind and that the regulations be given their natural meaning within the scope of such statutory purposes."

In connection with the Revenue Act of 1939, the Senate Committee on Finance through its chairman, Senator Harrison, issued a report—calendar No. 699, Re-

port No. 648—in which it is stated that—in addition to tanners and producers and processors of nonferrous metals who in the Revenue Act of 1938 had been specifically granted the optional use of such method, the option to use the last-in-first-out method was being extended to "all taxpayers who use it, apply for it, and use it consistently, regardless of the business in which the taxpayer is engaged." While the last part of this statement may seem very broad and almost all-inclusive, the first part is definitely restrictive. It limits the use of last-in-first-out for tax purposes to those who can and do use it regularly in connection with financial operating statements made up from their ordinary books of account.

From its very nature, the last-in-first-out method is appropriate only in those businesses where continuity of related operations and the resultant continuity of inventory position is present. It has no application whatever in a series of short-time unrelated, speculative ventures. This is emphasized in the provisions of the law whereby replacements of reductions in inventory below the starting point must be carried on the books at the new cost.

Continuity of operations exists in many companies for various reasons. Operations involving large fixed investment in processes or manufacturing equipment limited in use to more or less definitely similar types of products; operations in relatively narrow markets where public need and consumption, from a quantitative standpoint, are to a large extent stabilized; operations in fields where raw-material supply cannot be quickly or advantageously controlled; operations in lines where necessarily slow turnover precludes buying and selling of the same physical units against a definite or predeterminable price relationship—these are some of the situations requiring a high degree of continuity or persistence of inventory position. These

are all situations where true or distributable profits under cost or market accounting methods can only be determined from a long-range viewpoint. There are also situations where volume of operations and current-replacement profit margins are the only available short-term criteria of operating success or failure. They are all situations where last-in-first-out is preferable from a management standpoint. They are the sort of situations where it was intended that last-in-first-out could also be used for determining taxable income if the taxpayer so desired.

In this area of business, inventories are seldom as simple in nature and composition as those used as illustrative examples in the last-in-first-out amendment and regulations. The shifting in emphasis in a business from high grades to low grades, or vice versa, is perhaps one of the most common changes which occur from time to time in inventories of this sort. Some companies carry varying styles or models of the same basic product in their line, while others even carry a variety of basic products which are only slightly related. The composition of many inventories is never twice the same as regards grades, types, etc. Such inventories are always being affected by style changes, economic conditions, availability of raw material, competition, etc. Yet at all times, for one or more of the reasons mentioned, there is that real necessity for more or less continuity and persistence of inventory position which justify the use of last-in-first-out for properly determining current profit-or-loss results.

On the other hand, there are many instances in business where the situation is quite different. While superficially there may be considerable similarity in appearance, basically they must be classed as coming within that area of business where operations are really a series of separate ventures. In such cases each venture is

more or less unique and profit or loss thereon is similarly unrelated to other operations. In such cases last-in-first-out is not indicated and any attempt to use it can only end in confusion and misleading results. In some instances, however, each of the ventures may extend over several years, and during such periods yearly results can only be shown properly by the use of last-in-first-out. Fortunately the mechanics of last-in-first-out are such as to permit its use under such circumstances. Each venture will stand by itself, during its life, provided the several inventories involved are handled separately as they appear and disappear over the years.

Each situation must be individually scrutinized. In many instances the answer is far from obvious. In some cases it will take years, and perhaps even litigation, to establish the proper status. Only the experience of time will determine the final workable limits within which last-in-first-out method is fundamentally appropriate for business use and therefore acceptable to the Treasury Department.

The first step in adapting the last-in-first-out method to a particular business is to classify the inventories involved into control groups of integral category. Income-tax regulations state that inventories are to be segregated into natural groups on the basis of either (1) similarity in factory processes through which they pass, (2) similarity of raw materials used, or (3) similarity in style, shape, or use of finished products. The amendment itself states that the use of the last-in-first-out method is to be prescribed by regulation so as to clearly reflect income. The regulations repeat these words several times and in one place say that the true income of the taxpayer is to be clearly reflected. It is necessary, therefore, in segregating inventory items into groups of integral category to establish reasonable proof that such classification does not in itself materially dis-

tort income determination under the precepts of last-in-first-out.

Probably the most direct and positive determination of the efficacy of any particular technique in connection with last-in-first-out is whether, under a condition of balanced operations where opening and closing inventory quantities are the same, the purchases in dollars for a year become the cost of sales in dollars for the year, and the closing inventory balance in dollars is the same as the opening. A little study will show that this can result only when, in an integral group, the various component items thereof bear essentially the same percentage price relationships to each other at various price levels.

If the unit cost price of item "B" is always three hundred per cent of or three times the unit cost price of item "A," then at any time three units of item "A" are equivalent to one unit of item "B." If three units of item "A" in an opening inventory are later sold and replaced by one unit of item "B," then the purchase cost of the one unit of item "B" can be used as the cost-of-sales of the three units of item "A" since, at the time of purchase, it is the same as the cost of replacing three units of item "A." If still later the one unit of item "B" is sold and replaced by three units of item "A" then the purchase cost of the "A" items is similarly a proper cost-of-sales for the "B" item. In the end there are three units of item "A" on hand and the inventory account has the same dollar balance. Current purchases have constituted the cost-of-sales.

On the other hand if, when the one unit of item "B" is replaced by item "A" units, a different proportional price relationship exists—such as four to one instead of three to one, for instance—then a different quantity of "A" units is equivalent in terms of replacement cost to the one "B" unit. In the example just mentioned the cost of four "A" units is the proper cost-

of-sales for the one "B" unit since such is the replacement cost of the "B" unit; but only three "A" units are needed to bring the inventory on hand back to its original quantity. The fundamental requirements of last-in-first-out are not met, and true income cannot be reflected.

It would seem axiomatic that a fourth requirement must be added to the three specifically mentioned in the regulations regarding inventory groupings. This requirement is that all inventory items in a group control shall have price-pattern similarity. In other words they should all follow, within reasonable limits, the same price index. This point was not specifically covered in the regulations because it is quite obviously an inherent requisite of last-in-first-out itself.

It was stated earlier that inventory accounting is not an exact science. It was probably with this in mind that the word "similar" was used in the regulations rather than some term implying exact duplication or outright equivalence. Apparently there is sufficient latitude implied to permit a rational handling of the practical aspects of ordinary inventory situations without any sacrifice of the restrictions which are necessary to limit the proper application of last-in-first-out to that area of business where it is fundamentally appropriate and therefore justified as a means of determining taxable income. Here, as before, the human element in the form of individual judgment is present. Between companies, differences of opinion will occur as always. In any one company, consistency of policy and practice will continue to be the saving grace by which income may be clearly reflected and by which the requirements of the Treasury Department may be satisfied.

Several points need to be considered regarding this necessity of similarity in price pattern amongst the various items in an inventory group of integral category.

One is that similarity exists in percentage or proportional change of price, not in price differentials. Parallel curves resulting from plotting prices indicate constant price differentials between items, but not a constant proportional relationship. It is only when approximately parallel price curves result from using ratio or logarithmic vertical ordinates that the requisite similarity of price pattern is indicated. This may necessitate the separation of the manufacturing or processing cost element from the raw stock or material element in work-in-process and finished-goods inventories. When separated, each group may easily qualify as to requisite similarity of price pattern amongst its component items; but when combined, a varying percentage relationship exists which precludes the handling of the various items in the same group.

It must always be kept in mind, in connection with last-in-first-out, that any reference to price means unit cost. While it may be true that in some instances relative sales values are used as a basis for allocating cost over multiple products it is the unit purchase or incurred cost which must be used in connection with determining similarity of price pattern.

In practice there is a considerable difference between expense and inventoriable costs. A change in handling certain items, such as warehouse expense or primary distribution costs, may result in unit product costs which will permit various items to be grouped together; or the inclusion of an interest element—charges for borrowed money or even interest on total investment—may bring various items into the necessary relationship. In some cases a more factual and less arbitrary basis for burden distribution would improve the picture sufficiently. In instances where inward transportation is a large element of the cost of a certain few items, it may be that the segregation of these more or less fixed

unit charges into a separate control group will leave commodity elements whose unit costs follow sufficiently the price pattern of the other items.

Whenever prices or unit costs are being analyzed for the existence or nonexistence of price-pattern similarity, care must be taken that the items under consideration are well classified or identified so that they are really comparable as to those factors which make for relative unit value. Quality, age, utility, whether imported or domestic, mill run or selected, size or lot, etc., are examples. If a different grade or condition of a particular raw material is purchased this should be considered as a different item. If the price of this different quality of material regularly follows the same price pattern as the original, then it may properly be included in the same group.

When items are purchased at different times, with varying effect from these factors, it may be more feasible to convert each purchase to an equivalent standard base-unit price for inventory purposes and clear the different through a purchase-variance account. Infrequent, small-lot purchases, at higher prices than usual, might be reduced in cost to normal and the difference charged off. Purchases of distressed merchandise, if of standard grade, might conceivably be brought up to normal price, with the difference held in a reserve account to be cleared into operations over the turnover period involved. An occasional instance of forward buying, where an additional quantity discount is involved, could be handled in the same way as far as the exceptional discount is concerned. Careful consideration of each inventory situation will point the way to various suitable practices which will help bring various items into a price-pattern similarity that will qualify them for inclusion in a control group of integral category.

Finally, in connection with the question



of requisite similarity of price pattern, it is well to give some thought to prices in general and price cycles in particular. It was said previously that when various items had a fairly close price-pattern similarity they, *ipso facto*, followed within reasonable limits the same price index. The reverse of this is equally true. When items follow approximately the same price index they have price-pattern similarity.

A fund of knowledge regarding price indices has been accumulated. Many price indices are maintained by trade associations, economic institutions, business magazines, and Federal government bureaus. Whenever a series of related prices is divided through by some constant number, then a price index has been developed. Usually the constant is the price at a particular time. This datum price becomes unity or one hundred, and all other prices are expressed relatively as a ratio thereto.

The study of prices through their indices has revealed many economic phenomena. It has shown that most prices run in cycles. Many prices run in short-period, minor cycles of narrow amplitude within long-period, major cycles of wide amplitude. Short-period cycles are often caused by seasonal factors or isolated circumstances of brief import. Almost all prices respond to the so-called economic or general business cycle. Many individual prices show, in addition, a definite correlation with the life cycle of some related industry.

Over the years it has been shown that, from a long-range viewpoint, most prices can be sorted into a relatively few, rather large, but definite groups, the components of which tend to follow a fairly similar price pattern during each long-period, major cycle. Basic commodities, wholesale goods, retail goods, farm products, luxury goods, food products, etc., are such groups. These main groups are more or less universally agreed upon by economists, business execu-

tives, and governmental agencies. For many years the authenticity of the established and published price indices of these several groups has been widely recognized. Similarly derived price indices for most of leading industries are available and possess equal dependability.

The determination of true profit in business for short periods is practically impossible under any system or method of accounting. Theoretically, such determination of profit is only possible when a business is terminated by liquidation. The basic structure of accounting was conceived and developed when closing the books implied closing out the business venture. At best, accounting is still preponderantly empirical. Probably the nearest approach to anything like a real determination of true profit, in a continuously operated going concern, would be to synchronize accounting periods with major price cycles. This of course is impossible, and some practical and generally acceptable expedient is necessary to establish interim results. The fundamental purpose of last-in-first-out is simply to segregate—more rationally than has heretofore been possible—for interim yearly periods the eventual, final profit of a major cycle of several years' duration. One of the compelling reasons for these interim-profit determinations is the necessity, under Federal tax laws, of reporting—as best we may—annual taxable income.

In the light of this it would seem that the essential requirements of interim-profit determination could be satisfied, in many instances, through the use of last-in-first-out with composite inventories segregated into a relatively few accounting control groups, where the basis of classification was simply the same as that which establishes the composition of the various recognized price groups for which published price indices are regularly maintained. Even though considerable latitude



were permitted, the results would undoubtedly much more clearly reflect true income by years than would conventional cost-or-market methods.

The second step in adapting last-in-first-out to a particular business is to establish some practical, routine procedure for handling the running grist of detail. A large part of the detail centers on the need for relating all inventory quantities in each control group to a common denominator or base unit for purposes of direct comparison. The use of base dollars is suggested. The term "base dollars" is used for lack of anything better. The principles involved are not new although perhaps never used before in inventory accounting. They are somewhat akin, in basic procedure, to those underlying the figuring of average discount or interest periods in credit and collection practice.

The basic quantity-price-value relationship is usually expressed as follows:

Quantity times Price in Dollars equals Value in Dollars. It is of course equally true that:

Quantity equals Value in Dollars divided by Price in Dollars.

By using the significant initials of the above terms as algebraic symbols, a simple equation emerges:

$$(1) \quad Q = \frac{V}{P}$$

The ratio of one quantity such as  $Q_2$  to another quantity such as  $Q_1$  can therefore be expressed as follows:

$$(2) \quad \frac{Q_2}{Q_1} = \frac{\frac{V_2}{P_2}}{\frac{V_1}{P_1}},$$

where  $V_2$  and  $P_2$  are the value in dollars and the price in connection with quantity  $Q_2$  while  $V_1$  and  $P_1$  are the value in dollars and the price in connection with quantity  $Q_1$ .

It is evident from this last equation that the ratio or percentage of one quantity to another quantity can be shown by a fraction in which all the terms are expressed in dollars.

It is also true that

$$(3) \quad Q_2 \pm Q_1 = \frac{V_2}{P_2} \pm \frac{V_1}{P_1}$$

Thus various quantities can also be added or subtracted through the use of terms expressed only in dollars.

To establish last-in-first-out for each inventory control group the following is required:

1. Establish the opening inventory in total quantity, average actual cost price and extended amount.
2. Establish purchases for the year in chronological sequence by individual purchases and in total, in quantity, actual cost price and extended amount.
3. Relate purchases for the year quantitatively, by individual purchases and in total, to the established opening inventory.
4. Establish closing inventory in terms of individual purchases or reasonably close similitude thereto and in total, in quantity, actual cost price and extended amount.
5. Relate closing inventory quantitatively, by individual purchases and in total, to the established opening inventory.
6. Substitute, to the quantitative proportional extent thereof, the established opening inventory value in place of the closing inventory; and price any excess quantity, remaining in the closing inventory, at actual purchase cost during the year according to one of the three options permitted.

The following illustrative examples indicate how these problems can be handled

quite simply through the use of price indices and base dollars.

First, consider a simple example covering an inventory of a single kind of unit with wide price fluctuations. This will be worked out first through ordinary means

and second through the use of base dollars. Base dollars are not of great benefit in this case, but the example will serve as a means of introducing the procedures involved.

There is little in the ordinary handling

*Opening Inventory at Cost*

(1) Item	(2) Units	(3) % of Total Units	(4) Cost Price	(5) Actual Cost Amount	(6) Averaged Cost Amount @ 3.20	(7) % of Total Cost
(a)	5,200	20.8	\$1.60	\$ 8,320.00	\$16,640.00	20.8
(b)	9,000	36.0	2.40	21,600.00	28,800.00	36.0
(c)	1,000	4.0	3.20	3,200.00	3,200.00	4.0
(d)	3,000	12.0	4.00	12,000.00	9,600.00	12.0
(e)	2,000	8.0	4.80	9,600.00	6,400.00	8.0
(f)	3,800	15.2	5.60	21,280.00	12,160.00	15.2
(g)	1,000	4.0	4.00	4,000.00	3,200.00	4.0
A	25,000	100.0	\$3.20	\$80,000.00	\$80,000.00	100.0

*Purchases During Year at Cost*

(1) Item	(2) Units	(3) % of Total Opng. Inv.	(4) Cost Price	(5) Actual Cost Amount
B	1,000	4.0	\$3.52	\$3,520.00
C	2,000	8.0	3.52	7,040.00
D	1,000	4.0	3.68	3,680.00
E	2,000	8.0	4.00	8,000.00
F	3,000	12.0	4.00	12,000.00
G	1,000	4.0	4.32	4,320.00
H	2,000	8.0	4.16	8,320.00
J	1,000	4.0	4.00	4,000.00
K	2,000	8.0	3.84	7,680.00
L	2,000	8.0	3.52	7,040.00
M	1,000	4.0	2.88	2,880.00
N	2,000	8.0	2.56	5,120.00
Y	20,000	80.0	\$3.68	\$73,600.00

*Closing Inventory at End of Year at Cost*

(1) Item	(2) Units	(3) % of Total Opng. Inv.	(4) Cost Price	(5) Actual Cost Amount
(b)	8,000	\$32.0	\$2.40	\$19,200.00
(d)	2,500	10.0	4.00	10,000.00
(f)	3,000	12.0	5.60	16,800.00
C	2,000	8.0	3.52	7,040.00
E	1,500	6.0	4.00	6,000.00
F	3,000	12.0	4.00	12,000.00
H	2,000	8.0	4.16	8,320.00
J	1,000	4.0	4.00	4,000.00
K	2,000	8.0	3.84	7,680.00
L	2,000	8.0	3.52	7,040.00
M	1,000	4.0	2.88	2,880.00
N	2,000	8.0	2.56	5,120.00
Z	30,000	120.0	\$3.536	\$106,080.00

*Closing Inventory, Last-In-First-Out*

Excess valued with reference to actual cost of most recent acquisitions during year

(1)	(2)	(3)	(4)	(5)
Item	Units	% of Total Opng. Inv.	Cost Price	Actual Cost Amount
A	25,000	100.0	\$3.20	\$80,000.00
N	2,000	8.0	2.56	5,120.00
M	1,000	4.0	2.88	2,880.00
L	2,000	8.0	3.52	7,040.00
Z	30,000	120.0	\$3.168	\$95,040.00

*Closing Inventory, Last-In-First-Out*

Excess valued with reference to actual cost of earliest acquisitions during year

(1)	(2)	(3)	(4)	(5)
Item	Units	% of Total Opng. Inv.	Cost Price	Actual Cost Amount
A	25,000	100.0	\$3.20	\$80,000.00
B	1,000	4.0	3.52	3,520.00
C	2,000	8.0	3.52	7,040.00
D	1,000	4.0	3.68	3,680.00
E	1,000	4.0	4.00	4,000.00
Z	30,000	120.0	\$3.274	\$98,240.00

*Closing Inventory, Last-In-First-Out*

Excess valued with reference to average actual cost of all acquisitions during year

(1)	(2)	(3)	(4)	(5)
Item	Units	% of Total Opng. Inv.	Cost Price	Actual Cost Amount
A	25,000	100.0	\$3.20	\$80,000.00
Y	5,000	20.0	3.68	18,400.00
Z	30,000	120.0	\$3.28	\$98,400.00

of this example to arouse comment except perhaps the use of percentages to relate purchases, closing inventory, etc., to the opening inventory. A little study will show that this is entirely feasible.

In the light of this illustration, the algebraic equations previously shown can be used as a means of eliminating the necessity of dealing with quantities.

From equation (3) it is obvious that if

$$(4) \quad Q_1 + Q_2 = Q_t,$$

then

$$(5) \quad \frac{V_1}{P_1} + \frac{V_2}{P_2} = \frac{V_t}{P_t}.$$

As stated under the discussion of price

indices, price-index numbers can be established by dividing through a series of related prices by any one of the individual prices which it is desired to use as unity or one hundred per cent. In this last equation, if both sides are divided through by  $P_t$ , the denominators of the several fractions become price-index numbers. If  $N$  is used as a symbol for such numbers, then:

$$(6) \quad \frac{V_1}{N_1} + \frac{V_2}{N_2} = V_t.$$

Furthermore it is obvious that there is the same inter-relationship between the several parts of this equation as there is in equation (4).

In other words,  $V_1/N_1$  is the same percentage of  $V_T$  as  $Q_1$  is of  $Q_T$  and the sum of the several percentages of  $V_1/N_1$  and  $V_2/N_2$  to  $V_1$  equals one hundred.

Under last-in-first-out, the basic problem is to establish the opening inventory for each control group in total quantity, average cost price, and extended amount. For the illustrative example this can now be done as follows:

*Opening Inventory at Cost*

(1)	(4)	(5)	(8)	(9)	(11)	(11)	(12)
Item	Cost Price	Actual Cost Amount	Preliminary Price Index	Preliminary Base Dollars	Final Price Index	Final Base Dollars	% of Total Cost
(a)	\$1.60	\$8,320.00	0.40	\$20,800.00	0.50	\$16,640.00	20.8
(b)	2.40	21,600.00	0.60	36,000.00	0.75	28,800.00	36.0
(c)	3.20	3,200.00	0.80	4,000.00	1.00	3,200.00	4.0
(d)	4.00	12,000.00	1.00	12,000.00	1.25	9,600.00	12.0
(e)	4.80	9,600.00	1.20	8,000.00	1.50	6,400.00	8.0
(f)	5.60	21,280.00	1.40	15,200.00	1.75	12,160.00	15.2
(g)	4.00	4,000.00	1.00	4,000.00	1.25	3,200.00	4.0
A		\$80,000.00	0.80	\$100,000.00	1.00	\$80,000.00	100.0

From the information given here, the average cost price of the entire opening inventory is unknown. This makes it impossible to develop immediately a price index using this average cost price as unity. However, a preliminary price index can be established by using any of the known prices as a reference. In this case \$4.00, the price of the last item, was used. This gave preliminary index numbers for the separate items as shown in column (8). These numbers divided respectively into the several actual cost amounts give the preliminary base dollars in column (9). The total actual cost amount divided by the total preliminary base dollars gives the preliminary price-index number of the total inventory.

The final price-index number for the total inventory must necessarily be unity. By multiplying the several preliminary price-index numbers by the ratio of one to this preliminary index number for the total inventory, the desired results are obtained as shown in column (10). Since prices are proportional to price-index num-

bers, it is now easy to determine the average cost price of the total inventory as shown at the bottom of column (4). Since \$1.60, which is the cost price of item (a), has an index number of 0.50 then the cost price which would have an index number of 1.00 must be twice \$1.60 or \$3.20.

By dividing the several actual cost amounts and the total actual cost amount by their respective final price-index num-

bers, the desired final base dollars as shown in column (11) are produced. The percentage of each of these final base-dollar amounts to the total is shown in column (12).

Comparison of these figures with those previously produced under ordinary methods will show that all of the necessary results have been precisely duplicated without any use of quantities at all. The final base dollars are just as definitely a quantitative measure of inventory as the quantities themselves.

With the opening inventory thus established, the next problem is to relate purchases and closing inventory thereto on a percentage basis. Equation (2) is:

$$(2) \quad \frac{Q_2}{Q_1} = \frac{\frac{V_2}{P_2}}{\frac{V_1}{P_1}}$$

If  $Q_1$  represents the opening inventory quantity then  $V_1$  is the total cost and  $P_1$

the average cost of that opening inventory.

Since in the above equation  $P_2$  and  $P_1$  are respectively in the numerator and denominator of a fraction it is possible to divide them both by the same figure without disturbing the balance. If  $P_1$  is used as a divisor, then price-index numbers result with that for  $P_1$  being unity. Using  $N$  as a symbol for these numbers the equation becomes:

$$(7) \quad \frac{Q_2}{Q_1} = \frac{\frac{V_2}{N_2}}{\frac{V_1}{N_1}}$$

The ratio of any inventory quantity, in a simple control group, to the total opening inventory quantity of that group can be

established by dividing the total actual cost in dollars of the opening inventory into the total actual cost in dollars of that particular inventory divided by its price-index number where the price index used has the average actual cost price of the total opening inventory as unity. This is merely using base dollars as previously defined.

Thus inventories under last-in-first-out, within a simple control group like the one involved in this example, can readily be related to one another by using their respective base-dollar amounts instead of quantities.

The rest of this example works out readily through the use of base dollars as follows:

*Purchases During Year at Cost*

(1) Item	(4) Cost Price	(5) Actual Cost Amount	(10) Price Index	(11) Base Dollars	(12) % of Total Opng. Inv.
B	\$3.52	\$3,520.00	1.10	\$3,200.00	4.0
C	3.52	7,040.00	1.10	6,400.00	8.0
D	3.68	3,680.00	1.15	3,200.00	4.0
E	4.00	8,000.00	1.25	6,400.00	8.0
F	4.00	12,000.00	1.25	9,600.00	12.0
G	4.32	4,320.00	1.35	3,200.00	4.0
H	4.16	8,320.00	1.30	6,400.00	8.0
J	4.00	4,000.00	1.25	3,200.00	4.0
K	3.84	7,680.00	1.20	6,400.00	8.0
L	3.52	7,040.00	1.10	6,400.00	8.0
M	2.88	2,880.00	0.90	3,200.00	4.0
N	2.56	5,120.00	0.80	6,400.00	8.0
Y	\$3.68	\$73,600.00	1.15	\$64,000.00	80.0

*Closing Inventory at End of Year at Cost*

(1) Item	(2) Cost Price	(5) Actual Cost Amount	(10) Price Index	(11) Base Dollars	(12) % of Total Opng. Inv.
(b)	\$2.40	\$19,200.00	0.75	\$25,600.00	32.0
(d)	4.00	10,000.00	1.25	8,000.00	10.0
(f)	5.60	16,800.00	1.75	9,600.00	12.0
C	3.52	7,040.00	1.10	6,400.00	8.0
E	4.00	6,000.00	1.25	4,800.00	6.0
F	4.00	12,000.00	1.25	9,600.00	12.0
H	4.16	8,320.00	1.30	6,400.00	8.0
J	4.00	4,000.00	1.25	3,200.00	4.0
K	3.84	7,680.00	1.20	6,400.00	8.0
L	3.52	7,040.00	1.10	6,400.00	8.0
M	2.88	2,880.00	0.90	3,200.00	4.0
N	2.56	5,120.00	0.80	6,400.00	8.0
Z	\$3.536	\$106,080.00	1.105	\$96,000.00	120.0



*Closing Inventory, Last-In-First-Out*

Excess valued with reference to actual cost of most recent acquisitions during year.

(1) Item	(11) Base Dollars	(12) % of Total Opng. Inv.	(10) Price Index	(13) Actual Cost Amount
A	\$80,000.00	100.0	1.00	\$80,000.00
N	6,400.00	8.0	0.80	5,120.00
M	3,200.00	4.0	0.90	2,880.00
L	6,400.00	8.0	1.10	7,040.00
Z	\$96,000.00	120.0	0.99	\$95,040.00

*Closing Inventory, Last-In-First-Out*

Excess valued with reference to actual cost of earliest acquisitions during year.

(1) Item	(11) Base Dollars	(12) % of Total Opng. Inv.	(10) Price Index	(13) Actual Cost Amount
A	\$80,000.00	100.0	1.00	\$80,000.00
B	3,200.00	4.0	1.10	3,520.00
C	6,400.00	8.0	1.10	7,040.00
D	3,200.00	4.0	1.15	3,680.00
E	3,200.00*	4.0	1.25	4,000.00
Z	\$96,000.00	120.0	1.02½	\$98,240.00

\* ½ of \$6,400.00.

*Closing Inventory, Last-In-First-Out*

Excess valued with reference to average cost of all acquisitions during year.

(1) Item	(11) Base Dollars	(12) % of Total Opng. Inv.	(10) Price Index	(13) Actual Cost Amount
A	\$80,000.00	100.0	1.00	\$80,000.00
Y	16,000.00*	20.0	1.15	18,400.00
Z	\$96,000.00	120.0	1.025	\$98,400.00

\* ⅓ × 64,000.00

Where the closing inventory is less than the opening inventory, the base-dollar total of the closing inventory is the desired closing inventory, since in dollars it is automatically the quantitative proportion still remaining of the established opening inventory in dollars at average actual cost.

As stated before, the advantages of base dollars in connection with this simple example are not great. However, in situations where a variety of items is involved it becomes exceedingly useful. Before working out a typical example of this sort, it is necessary to expand the mathematical principles involved a little further. Con-

sider first the relationships involved in two items  $a$  and  $t$  where the price of  $a$  is always  $K_a$  times that of  $t$ :

$$(8) \quad Q_a = \frac{V_a}{P_a}, \quad \text{and} \quad Q_t = \frac{V_t}{P_t}$$

$$(9) \quad P_a Q_a = V_a, \quad \text{and} \quad P_t Q_t = V_t$$

If  $V_a = V_t$ , then

$$(10) \quad P_a Q_a = P_t Q_t, \quad \text{and} \quad \frac{P_a}{P_t} Q_a = Q_t$$

Since

$$\frac{P_a}{P_t} = K_a,$$

then

$$(11) \quad Q_t = K_a Q_a.$$

In other words, if  $K_a$  is the constant ratio of the unit cost of item  $a$  to that of item  $t$  at all price levels, then the equivalent quantity of item  $t$  at any price level is  $K_a$  times the quantity of item  $a$ .

Since

$$(8) \quad Q_a = \frac{V_a}{P_a},$$

then

$$(12) \quad Q_t = K_a Q_a = \frac{K_a V_a}{P_a}.$$

Now assume two different inventories of various items  $a, b, c \dots t$  at various price levels 1, 2, 3  $\dots$  0, but where at all price levels there is a constant price relationship between the different items.

If one of these two inventories is divided into the other then:

$$(13) \quad \frac{Q_{a1} + Q_{b2} + Q_{c3}}{Q_{d4} + Q_{e5} + Q_{f6}} = \frac{\frac{V_{a1}}{P_{a1}} + \frac{V_{b2}}{P_{b2}} + \frac{V_{c3}}{P_{c3}}}{\frac{V_{d4}}{P_{d4}} + \frac{V_{e5}}{P_{e5}} + \frac{V_{f6}}{P_{f6}}}.$$

If each of these quantities were multiplied by the ratios  $K_a, K_b, K_c$ , etc., of the respective unit prices to that of item  $t$ , the resulting quantities would be the equivalent quantities of item  $t$ . Then the quantities in the numerator of the fraction could be combined; and similarly the quantities in the denominator.

To do this in the above equation it is necessary to multiply each corresponding item on the right hand side by the same price ratio. Then,

$$\begin{aligned} & \frac{K_a Q_{a1} + K_b Q_{b2} + K_c Q_{c3}}{K_d Q_{d4} + K_e Q_{e5} + K_f Q_{f6}} \\ &= \frac{Q_{t1} + Q_{t2} + Q_{t3}}{Q_{t4} + Q_{t5} + Q_{t6}} \end{aligned}$$

(14)

$$\begin{aligned} & \frac{\frac{K_a V_{a1}}{P_{a1}} + \frac{K_b V_{b2}}{P_{b2}} + \frac{K_c V_{c3}}{P_{c3}}}{\frac{K_d V_{d4}}{P_{d4}} + \frac{K_e V_{e5}}{P_{e5}} + \frac{K_f V_{f6}}{P_{f6}}} \\ &= \frac{K_a V_{a1}}{K_d P_{d4}} + \frac{K_b V_{b2}}{K_e P_{e5}} + \frac{K_c V_{c3}}{K_f P_{f6}} \end{aligned}$$

Each of the prices shown such as  $P_{a1}, P_{b2}$ , etc. has a definite price relationship to that of item  $t$  at the same price level, namely  $K_a, K_b$ , etc. Substituting for the prices shown their equivalents in terms of corresponding prices of item  $t$ , then

$$(15) \quad \begin{aligned} & \frac{Q_{t1} + Q_{t2} + Q_{t3}}{Q_{t4} + Q_{t5} + Q_{t6}} \\ &= \frac{\frac{K_a V_{a1}}{K_a P_{t1}} + \frac{K_b V_{b2}}{K_b P_{t2}} + \frac{K_c V_{c3}}{K_c P_{t3}}}{\frac{K_d V_{d4}}{K_d P_{t4}} + \frac{K_e V_{e5}}{K_e P_{t5}} + \frac{K_f V_{f6}}{K_f P_{t6}}} \end{aligned}$$

In each simple fraction on the right hand side of the  $K$  factors cancel out. Now, since all prices are of the same item they can be divided through by a constant such as  $P_{t0}$ , the price of item  $t$  at price level 0. In other words, corresponding price-index numbers  $N_1, N_2$ , etc., can be substituted for the prices as now shown. The last equation may therefore be written

$$(16) \quad \frac{Q_{t1} + Q_{t2} + Q_{t3}}{Q_{t4} + Q_{t5} + Q_{t6}} = \frac{\frac{V_{a1}}{N_1} + \frac{V_{b2}}{N_2} + \frac{V_{c3}}{N_3}}{\frac{V_{d4}}{N_4} + \frac{V_{e5}}{N_5} + \frac{V_{f6}}{N_6}}.$$

Since items  $a, b, c \dots t$  have price similarity, the price index numbers,  $N_1, N_2, N_3, \dots N_6 = 1$  apply to them all individually and as a group. In short, the price-index numbers are indicative of relative-group-price levels as well as relative prices of each item.

If, in the last equation, the inventory in the denominator as a whole were taken as  $Q_t$  at price level 0, for which the price-index number is unity, then:

$$(17) \frac{Q_{i1} + Q_{i2} + Q_{i3}}{Q_{i0}} = \frac{\frac{V_{a1}}{N_1} + \frac{V_{a2}}{N_2} + \frac{V_{a3}}{N_3}}{V_{i0}}$$

Now if  $Q_{i0}$  is considered as the total opening inventory of a group of items of integral category with an average actual cost level of 0 and  $[Q_{a1} + Q_{a2} + Q_{a3}]$  as some other total inventory of the same group such as the closing inventory it is evident that the second total inventory can be related quantitatively to the opening total inventory through the use of base dollars for the several individual item quantities, provided the price-index numbers used have as unity the average-group-price level of the opening total inventory.

Thus the same procedure, which was used in connection with the simple example involving only one kind of item, can be used equally well in a complicated situation where many different items are involved provided price similarity among the different items prevails. In short, this procedure of using base dollars is applicable to any inventory group of integral category.

In this connection it must always be kept in mind that the average price level of the total opening inventory is not merely the price level existing for the group on the date of the opening inventory.

The following example will illustrate the use of base dollars in the typical complicated situation common to many companies. It covers the entire handling of an inventory-control group which satisfies the basic requirement of having price similarity. As in the previous example, the results will be worked out first by ordinary methods and then by the use of base dollars. The contrast between the volume of figuring involved will indicate the advantage of the suggested method.

First is shown a summary table of prices for the various items at the different price levels together with the constant price relationships at all price levels which exist between the items. For reference later, when using base dollars, the preliminary price index employed and the final price index, based on the average cost of the total opening inventory, are shown.

Item	PRICE RELATIONSHIPS						Index of Price Relationship
	Unit Cost Prices at Various Price Levels						
	(1)	(2)	(3)	(4)	(5)	(6)	
(m)	1.60	2.40	3.20	4.00	4.80	5.60	1.0
(n)	2.40	3.60	4.80	6.00	7.20	8.40	1.5
(p)	3.20	4.80	6.40	8.00	9.60	11.20	2.0
(r)	4.80	7.20	9.60	12.00	14.40	16.80	3.0
(s)	7.20	10.80	14.40	18.00	21.60	25.20	4.5
(t)	8.00	12.00	16.00	20.00	24.00	28.00	5.0
(u)	9.60	14.40	19.20	24.00	28.80	33.60	6.0

#### PRELIMINARY PRICE INDEX

0.40	0.60	0.80	1.00	1.20	1.40
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#### FINAL PRICE INDEX

0.50	0.75	1.00	1.25	1.50	1.75
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It is of no significance that unity in the final price index is exactly at one of the price levels where certain items were acquired. In actual practice it would probably be at some intermediate level. All of the examples used in this discussion are of course simplified as much as possible.

## Opening Inventory at Cost

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price*	(6) Equivalent Base Units	(7) % of Total	(8) Averaged Cost Amount	(9) % of Total	(10) Averaged Cost Per Actual Unit
Price level (1)									
(m 1)	11,520	\$1.60	\$18,432.00	\$1.60	11,520	12.8	\$36,864.00	12.8	\$3.20
(s 1)	3,200	7.20	23,040.00	1.60	14,400	16.0	46,080.00	16.0	14.40
(t 1)	1,800	8.00	14,400.00	1.60	9,000	10.0	28,800.00	10.0	16.00
Price level (3)									
(p 3)	1,800	6.40	11,520.00	3.20	3,600	4.0	11,520.00	4.0	6.40
(r 3)	1,800	9.60	17,280.00	3.20	5,400	6.0	17,280.00	6.0	9.60
(s 3)	400	14.40	5,760.00	3.20	1,800	2.0	5,760.00	2.0	14.40
(u 3)	900	19.20	17,280.00	3.20	5,400	6.0	17,280.00	6.0	19.20
Price level (4)									
(m 4)	19,800	4.00	79,200.00	4.00	19,800	22.0	63,360.00	22.0	3.20
(r 4)	1,200	12.00	14,400.00	4.00	3,600	4.0	11,520.00	4.0	9.60
Price level (6)									
(n 6)	3,600	8.40	30,240.00	5.60	5,400	6.0	17,280.00	6.0	4.80
(p 6)	2,700	11.20	30,240.00	5.60	5,400	6.0	17,280.00	6.0	6.40
(t 6)	936	28.00	26,208.00	5.60	4,680	5.2	14,976.00	5.2	16.00
A			\$288,000.00	\$3.20	90,000	100.0	\$288,000.00	100.0	

\* Item (m) taken as base unit

## Purchases During Year at Cost

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price	(6) Equivalent Base Units	(7) % of Total Opng. Inv.
Price level (4)						
(p 4)	4,500	\$ 8.00	\$36,000.00	\$4.00	9,000	10.0
(t 4)	2,700	20.00	54,000.00	4.00	13,500	15.0
Price level (5)						
(p 5)	2,700	9.60	25,920.00	4.80	5,400	6.0
(r 5)	600	14.40	8,640.00	4.80	1,800	2.0
(u 5)	600	28.80	17,280.00	4.80	3,600	4.0
Price level (6)						
(m 6)	9,000	5.60	50,400.00	5.60	9,000	10.0
(n 6)	4,800	8.40	40,320.00	5.60	7,200	8.0
Price level (4)						
(n 4)	2,400	6.00	14,400.00	4.00	3,600	4.0
(p 4)	1,800	8.00	14,400.00	4.00	3,600	4.0
Price level (2)						
(r 2)	600	7.20	4,320.00	2.40	1,800	2.0
(s 2)	1,200	10.80	12,960.00	2.40	5,400	6.0
Price level (1)						
(s 1)	200	7.20	1,440.00	1.60	900	1.0
(t 1)	720	8.00	5,760.00	1.60	3,600	4.0
(u 1)	600	9.60	5,760.00	1.60	3,600	4.0
Y			\$291,600.00	\$4.05	72,000	80.0

## Closing Inventory at End of Year at Cost

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price	(6) Equivalent Base Units	(7) % of Total Opng. Inv.
Price level (1)						
(s 1)	200	\$7.20	\$1,440.00	\$1.60	900	1.0
(t 1)	720	8.00	5,760.00	1.60	3,600	4.0
(u 1)	600	9.60	5,760.00	1.60	3,600	4.0
Price level (2)						
(r 2)	600	7.20	4,320.00	2.40	1,800	2.0
(s 2)	1,200	10.80	12,960.00	2.40	5,400	6.0
Price level (3)						
(p 3)	1,395	6.40	8,928.00	3.20	2,790	3.1
(r 3)	1,800	9.60	17,280.00	3.20	5,400	6.0
(u 3)	900	19.20	17,280.00	3.20	5,400	6.0

Price level (4)						
(n 4)	2,400	6.00	14,400.00	4.00	3,600	4.0
(p 4)	6,300	8.00	50,400.00	4.00	12,600	14.0
(t 4)	2,700	20.00	54,000.00	4.00	13,500	15.0
Price level (5)						
(p 5)	1,665	9.60	15,984.00	4.80	3,330	3.7
(r 5)	600	14.40	8,640.00	4.80	1,800	2.0
(u 5)	600	28.80	17,280.00	4.80	3,600	4.0
Price level (6)						
(m 6)	9,000	5.60	50,400.00	5.60	9,000	10.0
(m 6)	8,400	8.40	70,560.00	5.60	12,600	14.0
(p 6)	2,700	11.20	30,240.00	5.60	5,400	6.0
(t 6)	936	28.00	26,208.00	5.60	4,680	5.2
Z			\$411,840.00	\$4.16	99,000	110.0

*Closing Inventory, last-in-first-out*

Excess valued with reference to actual cost of most recent acquisitions during year.

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price	(6) Equivalent Base Units	(7) % of Total Opng. Inv.
A			\$288,000.00	\$3.20	90,000	100.0
(u 1)	600	\$9.60	5,760.00	1.60	3,600	4.0
(t 1)	720	8.00	5,760.00	1.60	3,600	4.0
(s 1)	200	7.20	1,440.00	1.60	900	1.0
(r 2)	200	10.80	2,160.00	2.40	900	1.0
Z			\$303,120.00	\$3.06	99,000	110.0

*Closing Inventory, last-in-first-out*

Excess valued with reference to actual cost of earliest acquisitions during year.

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price	(6) Equivalent Base Units	(7) % of Total Opng. Inv.
A			\$288,000.00	\$3.20	90,000	100.0
(p 4)	4,500	\$8.00	36,000.00	4.00	9,000	10.0
Z			\$324,000.00	\$3.27	99,000	110.0

*Closing Inventory, last-in-first-out*

Excess valued with reference to average actual cost of all acquisitions during year.

(1) Item and Price Level	(2) Actual Units	(3) Cost Price	(4) Actual Cost Amount	(5) Base Unit Cost Price	(6) Equivalent Base Units	(7) % of Total Opng. Inv.
A			\$288,000.00	\$3.20	90,000	100.0
Y			36,450.00	4.05	9,000	10.0
Z			\$324,450.00	\$3.27	99,000	110.0

The several final results in this example, as well as those in the previous one, have no significance as to the relative advantages or disadvantages of the three different options for valuing the quantitative excess of the closing inventory over the opening inventory. The choice of these options should not be based merely on the results of any one year. As a consistent policy to be used over the years, there seems to be the most logic to using the average cost for the whole year. Seasonal peaks in buying, however, might logically

indicate one of the other options as definitely preferable.

The mathematical proof of base dollars as shown above is obviously not exhaustively complete but should be sufficient to point out the fundamentals involved and to validate the conclusion reached.

The following solution of this last example by using base dollars needs no particular explanation. It will be seen that the final results exactly duplicate those arrived at by ordinary means.

In actual practice inventory records



## Opening Inventory at Cost

(1) Item and Price Level	(4) Actual Cost Amount	(11) Preliminary Price Index	(12) Preliminary Base Dollars	(13) Final Price Index	(14) Final Base Dollars	(7) % of Total
Price level (1)						
(m 1)	\$18,432.00	0.40	46,080.00	0.50	\$36,864.00	12.8
(s 1)	23,040.00	0.40	57,600.00	0.50	46,080.00	16.0
(t 1)	14,400.00	0.40	36,000.00	0.50	28,800.00	10.0
Price level (3)						
(p 3)	11,520.00	0.80	14,400.00	1.00	11,520.00	4.0
(r 3)	17,280.00	0.80	21,600.00	1.00	17,280.00	6.0
(s 3)	5,760.00	0.80	7,200.00	1.00	5,760.00	2.0
(u 3)	17,280.00	0.80	21,600.00	1.00	17,280.00	6.0
Price level (4)						
(m 4)	79,200.00	1.00	79,200.00	1.25	63,360.00	22.0
(r 4)	14,400.00	1.00	14,400.00	1.25	11,520.00	4.0
Price level (6)						
(n 6)	30,240.00	1.40	21,600.00	1.75	17,280.00	6.0
(p 6)	30,240.00	1.40	21,600.00	1.75	17,280.00	6.0
(t 6)	26,208.00	1.40	18,720.00	1.75	14,976.00	5.2
A	\$288,000.00	0.80	\$360,000.00	1.00	\$288,000.00	100.0

## Purchases During Year at Cost

(1) Item and Price Level	(4) Actual Cost Amount	(13) Price Index	(14) Base Dollars	(7) % of Total Opng. Inv.
Price level (4)				
(p 4)	\$36,000.00	1.25	\$28,800.00	10.0
(t 4)	54,000.00	1.25	43,200.00	15.0
Price level (5)				
(p 5)	25,920.00	1.50	17,280.00	6.0
(r 5)	8,640.00	1.50	5,760.00	2.0
(u 5)	17,280.00	1.50	11,520.00	4.0
Price level (6)				
(m 6)	50,400.00	1.75	28,800.00	10.0
(n 6)	40,320.00	1.75	23,040.00	8.0
Price level (4)				
(n 4)	14,400.00	1.25	11,520.00	4.0
(P 4)	14,400.00	1.25	11,520.00	4.0
Price level (2)				
(r 2)	4,320.00	0.75	5,760.00	2.0
(s 2)	12,960.00	0.75	17,280.00	6.0
Price level (1)				
(s 1)	1,440.00	0.50	2,880.00	1.0
(t 1)	5,760.00	0.50	11,520.00	4.0
(u 1)	5,760.00	0.50	11,520.00	4.0
Y	\$291,600.00	1.265625	\$230,400.00	80.0

## Closing Inventory at End of Year at Cost

(1) Item and Price Level	(4) Actual Cost Amount	(13) Price Index	(14) Base Dollars	(7) % of Total Opng. Inv.
Price level (1)				
(s 1)	\$1,440.00	0.50	\$2,880.00	1.0
(t 1)	5,760.00	0.50	11,520.00	4.0
(y 1)	5,760.00	0.50	11,520.00	4.0
Price level (2)				
(r 2)	4,320.00	0.75	5,760.00	2.0
(s 2)	12,960.00	0.75	17,280.00	6.0
Price level (3)				
(p 3)	8,928.00	1.00	8,928.00	3.1
(r 3)	17,280.00	1.00	17,280.00	6.0
(u 3)	17,280.00	1.00	17,280.00	6.0
Price level (4)				
(n 4)	14,400.00	1.25	11,520.00	4.0
(p 4)	50,400.00	1.25	40,320.00	14.0
(t 4)	54,000.00	1.25	43,200.00	15.0

Price level (5)				
(p 5)	15,984.00	1.50	10,656.00	3.7
(r 5)	8,640.00	1.50	5,760.00	2.0
(u 5)	17,280.00	1.50	11,520.00	4.0
Price level (6)				
(m 6)	50,400.00	1.75	28,800.00	10.0
(n 6)	70,560.00	1.75	40,320.00	14.0
(p 6)	30,240.00	1.75	17,280.00	6.0
(t 6)	26,208.00	1.75	14,976.00	5.2
Z	\$411,840.00	1.30	\$316,800.00	110.0

*Closing Inventory, last-in-first-out*

Excess valued with reference to actual cost of most recent acquisitions during year.

(1) Item and Price Level	(14) Base Dollars	(7) % of Total Opng. Inv.	(13) Price Index	(4) Actual Cost Amount
A	\$288,000.00	100.0	1.00	\$288,000.00
(u 1)	11,520.00	4.0	0.50	5,760.00
(t 1)	11,520.00	4.0	0.50	5,760.00
(s 1)	2,880.00	1.0	0.50	1,440.00
(s 2)	2,880.00	1.0	0.75	2,160.00
Z	\$316,800.00	110.0	0.95 $\frac{1}{11}$	\$303,120.00

*Closing Inventory, last-in-first-out*

Excess valued with reference to actual cost of earliest acquisitions during year.

(1) Item and Price Level	(14) Base Dollars	(7) % of Total Opng. Inv.	(13) Price Index	(4) Actual Cost Amount
A	\$288,000.00	100.0	1.00	\$288,000.00
(p 4)	28,800.00	10.0	1.25	36,000.00
Z	\$316,800.00	110.0	1.02 $\frac{1}{11}$	\$324,000.00

*Closing Inventory, last-in-first-out*

Excess valued with reference to average actual cost of all acquisitions during year.

(1) Items	(14) Base Dollars	(7) % of Total Opng. Inv.	(13) Price Index	(4) Actual Cost Amount
A	\$288,000.00	100.0	1.00	\$288,000.00
Y	28,800.00	10.0	1.265625	36,450.00
Z	\$316,800.00	110.0	1.02 $\frac{1}{11}$	\$324,450.00

would carry more detail than that shown in the solution of this example by base dollars. All of the established practices of effective stock record control would still be necessary.

On the other hand, all that is really needed for last-in-first-out calculations is actual cost and the relative unit cost level at the time of acquisition.

If relative unit cost levels for a particular group are determined by reference to an established price index such as one of those appearing in "Wholesale Prices" issued by the Bureau of Labor Statistics, the appropriate published figures would be used as the preliminary price-index num-

bers in connection with the opening inventory. Preliminary base dollars for each item would be extended and added. The ratio of total actual cost to total preliminary base dollars would give the preliminary price-index number for the entire opening inventory group under analysis. The ratio of one to this preliminary average price-index number would then be the multiplying factor to be applied to all price-index numbers from that published series to convert them to a series where the average actual cost price level of the said opening inventory was unity, which is necessary in the use of base dollars.

While it is a fact that only dollar

amounts are used in this proposed method, it is not true that the method provides or attempts to provide, a means for freezing or stabilizing the dollar inventory investment represented by the opening inventory. Base dollars are only quantitatively proportional amounts covering particular items of inventory goods or commodities which can be included in a group of integral category in a given company.

Although theoretically feasible, and in some instances perhaps desirable, to account for inventory valuations on a stabilized-dollar-investment basis, provided a real, all-inclusive, dollar-purchasing-power index could be established practically, no such scheme was ever contemplated in the last-in-first-out inventory amendment of the Internal Revenue Code.

Although prices do change similarly within various groups, there is more or less wide variance in price change between such groups and between any one such group and a composite group. Last-in-first-out inherently limits the inclusion of items in a group control to only those which have, among other similar characteristics as previously mentioned, that of similarity in price changes from time to time.

After base dollars have been used in a given situation long enough to establish sufficient familiarity with their real significance, many other applications will suggest themselves.

They would provide in some instances the only quantitative basis possible for a truly comparative sales analysis between customers, territories, salesmen, etc., as well as between different time periods such as quarters, years, decades, etc. They would provide an equitable basis for establishing sales commissions in certain instances where wide price fluctuations distort dollar volumes to a large extent. They would provide in some cases a workable basis for controlling merchandising policies

and accurately checking up actual results to those planned. The effect of seasonal price variations would be eliminated. Results of test selling campaigns and other forms of market analysis could be established quantitatively rather than in terms of sales dollars which often are distorted by current price levels.

In some industries it is often true that operating potentialities in any given company are actually a matter of basic quantities rather than invested capital expressed in dollars. Borrowing capacity more or less completely cushions the total dollar investment in inventories necessary at various price levels. To determine proper operating policies on information expressed in dollars only may be impossible because of general price fluctuations. If, however, price changes are due to changing grades or the equivalent, then base dollars as developed for last-in-first-out accounting, while furnishing a good start, would need to be further adjusted.

Bank loans for inventory purposes could frequently be rationalized so that both parties would appreciate the effects of price and quantity separately. Loans for carrying normal inventory quantities over a price peak need not be liquidated until lower replacement costs more or less automatically provide the free cash for their orderly liquidation; while loans for speculative quantities should of course be called before a business boom is culminated.

These possible further uses of base dollars are not being advanced here as anything conclusive. They are merely offered, parenthetically, as something to stimulate further research in situations where complexities in products, operations, etc., prove a serious hindrance to achieving the form and scope of analysis essential to and desired by modern business management.

Primarily, this procedure of base dollars has been developed with the hope that it might provide a much needed facility in

the practical application of last-in-first-out to that considerable area of business where its use is inherently desirable and justified but where, because of apparently insurmountable difficulties in the routine mechanics of its use, actual adoption has been seemingly hopeless.

At the same time it has been felt that perhaps something of a mathematically grounded analysis of the basic principles underlying last-in-first-out might help to clarify the fundamental issues involved and discourage attempts to present, innocently or otherwise, ill-conceived, ar-

bitrary, misguided, or capricious schemes of inventory valuation which were not solidly founded.

The last-in-first-out method can be of great value eventually to both American business and the Federal government, provided its application in actual practice is sanely expanded. Its definite limitations of application must be squarely recognized, but its inherent soundness and propriety must be equally well recognized. Otherwise it will become just another "noble experiment."

# PROFESSIONAL EXAMINATIONS

## A Department for Students of Accounting

HENRY T. CHAMBERLAIN

THE FOLLOWING problems were presented by the Board of Examiners of the American Institute of Accountants as the second half of the May, 1942 C.P.A. Examination in accounting theory and practice. The weights assigned were: problem 1, 14 points; problem 2, 14 points; problem 3, 10 points; problem 4, 6 points; problem 5, 6 points. The time allowed to solve all problems was six hours. A suggested time schedule follows:

Problem 1	60 minutes
Problem 2	100 minutes
Problem 3	40 minutes
Problem 4	40 minutes
Problem 5	30 minutes

### No. 1

1. The X Iron and Coal Company, a Virginia corporation, plans to reorganize as a Delaware corporation.

2. The Y Furnace Company, a New Jersey corporation, is wholly owned by the X Iron and Coal Company, the latter having purchased for cash at par all of the capital stock of the Y Furnace Company at inception. The Y Furnace Company has suffered considerable losses and a reorganization is contemplated through which its deficit may be liquidated.

3. The X Iron and Coal Company, preliminary to reorganization has decided upon a definite cancellation of \$180,000 of a total indebtedness of \$215,000 evidenced by the note of the Y Furnace Company which had previously been written down on the books of the X Iron and Coal Company to \$35,000.

4. It is planned to increase the number of shares of capital stock of the Y Furnace Company from 1,000 shares to 4,000 shares and to reduce the par value of each

share from \$100 to \$25, giving one share of new stock for each share of old stock.

5. Plant, equipment and inventory owned by the X Iron and Coal Company are to be transferred to the Y Furnace Company at sound values (which have been determined by appraisal to be the same as the net book values of these assets) in exchange for 3,000 shares of new capital stock.

6. The Z Iron and Coal Company of Delaware is organized with a capital of \$1,000,000, divided into 10,000 shares with a par value of \$100 each, for the purpose of acquiring the stock of the X Iron and Coal Company which is offered in share-for-share exchange.

7. Counsel has advised that taxes and legal fees involved will amount to \$500 for the Y Furnace Company and \$2,000 for the Z Iron and Coal Company.

8. The X Iron and Coal Company (Virginia) pays \$500 for taxes and legal fees.

9. The X Iron and Coal Company transfers all its assets and liabilities to the Z Iron and Coal Company (Delaware).

10. The X Iron and Coal Company (Virginia) is dissolved.

The audited balance-sheets, before reorganization of the X Iron and Coal Company and Y Furnace Company follow:

Assets	X Iron and Coal Co.	Y Furnace Co.
Cash.....	\$ 46,000	\$ 5,000
Receivables.....	5,500	500
Inventory.....	5,000	5,500
Y Furnace Co. Stock—1,000 shares of \$100.....	1	—
Demand note—face value \$215,000.....	35,000	—
Marketable securities.....	881,000	—
Plant and equipment, less depreciation.....	135,000	55,000
	<u>\$1,107,501</u>	<u>\$ 66,000</u>



<i>Liabilities</i>		
Accounts payable.....	\$ 10,000	\$ 2,000
X Iron and Coal Co.—note payable.....	—	215,000
Capital stock—\$100 per share.....	950,000	100,000
Surplus or (deficit).....	147,501	(251,000)
	<u>\$1,107,501</u>	<u>\$ 66,000</u>

Prepare columnar worksheets plainly indicating the required adjustments and transactions and showing the balance-sheets after giving effect to these plans.

## No. 2

The Sandford Manufacturing Company cannot meet its obligations and a receiver is appointed on April 28, 1941. The books are closed on that date and the following trial balance drawn off:

<i>Debits</i>		
Cash.....	\$ 800	
Receivables.....	1,400	
Finished goods.....	100,000	
Materials and supplies.....	15,000	
Goods on consignment (out).....	220,000	
Employees' bonds.....	4,700	
Unexpired insurance.....	800	
Machinery and equipment.....	507,300	
	<u>\$850,000</u>	
<i>Credits</i>		
Accounts payable.....	\$110,000	
Bank overdraft.....	1,000	
Bank loans.....	105,000	
Smith and Co.....	250,000	
Acceptances.....	23,000	
Collateral notes payable.....	4,700	
Lease—machinery.....	30,000	
Accrued interest on lease.....	2,000	
City taxes accrued.....	4,000	
Mortgage on machinery.....	100,000	
Accrued interest on mortgage.....	3,000	
Reserve for depreciation.....	7,300	
Capital stock—preferred.....	100,000	
Capital stock—common.....	100,000	
Surplus.....	10,000	
	<u>\$850,000</u>	

On November 20, 1941, the receiver, having disposed of all assets except \$400 accounts receivable which he considers doubtful, calls upon you to prepare an interim statement for the information of shareholders and creditors. An examination of the company's and the receiver's books and records discloses the following:

## 1. Cash receipts

Collection of accounts receivable.....	\$ 1,000
Rebate upon cancellation of all insurance.....	100
Proceeds from surrender of insurance policy on life of manager.....	1,000
Sales of finished goods during receivership.....	75,000
Rent of sublet portion of building.....	1,000
Unclaimed wages.....	500
Interest on bank account.....	200
Sale of all goods and supplies on hand after operations were discontinued.....	25,000
Sale of all machinery and equipment owned.....	200,000
	<u>\$303,800</u>

## 2. Cash disbursements

City taxes.....	\$ 4,000
Interest on city taxes.....	400
Mortgage.....	100,000
Interest on mortgage.....	5,000
Labor, materials and other operating and general expenses during receivership.....	61,000
	<u>\$170,400</u>

- Of the stock on hand at April 28th, finished goods costing \$60,000 were sold during the receivership and \$9,000 materials and supplies were used.
- The accounts payable are understated by \$10,000 and include an item of \$5,000 in dispute.
- The merchandise on consignment was pledged as collateral to the advances by Smith & Co. and was accepted by them in part payment of these advances at full book value.
- The collateral notes payable were for accommodation of employees and were secured by deposit of bonds. The notes were paid by the employees and the bonds returned to them.
- The lease covered machinery worth \$30,000 used by the company under a lease agreement. It was returned by the receiver and was accepted in full satisfaction of this agreement and all interest accrued.
- Claims were filed for all liabilities except an item of \$7,000 accounts payable.
- Receiver's fees need not be considered.

## Prepare:

- A columnar work sheet summarizing the foregoing data in rational manner and form; and
- A concise statement showing the realization of assets, liquidation of liabilities, and operations during the receivership; also unsecured creditors' claims and available assets on November 20, 1941.

## No. 3

The Special Product Manufacturing Company valued its finished-product in-

ventory on the basis of average yearly production cost and its raw-material inventory on the basis of first-in, first-out cost. Due to continuous fluctuation in the market price of the basic raw material used, the management proposes to change its inventory valuations from the cost basis to the basis of lower of cost or market.

The company inventory values at the beginning and end of 1941 were as follows:

	Jan. 1	Dec. 31
<b>Raw materials:</b>		
Tons on hand.....	2,000	1,000
Book value on first-in, first-out basis.....	\$53,000	\$22,500
Market value, per ton.....	\$ 20	\$ 30
<b>Finished product:</b>		
Tons on hand.....	750	900
Book value at average yearly cost.....	\$38,000	\$36,000
Market value, per ton.....	\$ 50	\$ 55

Costs other than raw materials have remained constant throughout the year. In 1941 19,000 tons of raw materials were

bought at a total cost of \$400,000. Shrinkage and waste in the manufacturing process amount to 25 per cent of the materials used.

Before making a decision, the management requests that you first show the result of changing from one basis to the other.

Prepare a comparative statement showing (a) the present and revised values and costs and the effect of the proposed change upon the December 31st balance-sheet; also (b) prepare the entry that would bring the books into agreement with the new plan if adopted.

#### No. 4

From the following transcript of "Insurance account" and "note" covering unrecorded liability prepare (a) a columnar analysis showing proper distribution of debits and credits. Prepare there from (b) the entries that will adjust surplus, profit and loss, and other December 31, 1941, balance-sheet headings involved.

#### INSURANCE ACCOUNT 1940

		Debits	Credits
July 2	Premium on fire-insurance policy (building), covering period from Aug. 1, '40 to July 31, '42.....	\$ 2,400	\$ —
Aug. 15	Premium on fire-insurance policy on stock of goods, period from Aug. 1, '40 to July 31, '41.....	1,800	—
Sept. 1	Premiums on employees' fidelity bonds, period from Aug. 1, '40 to July 31, '41.....	3,000	—
Oct. 25	Shortage of R. Jones to be reimbursed by Fidelity Insurance Company.....	900	—
Dec. 1	Refund due to reduction in rate on fire insurance on building, period Dec. 1, '40 to July 31, '42.....	—	200
Dec. 31	Transfer to profit and loss to close out account.....	—	7,900
		<u>\$ 8,100</u>	<u>\$ 8,100</u>
1941			
Feb. 8	Premium on liability insurance on trucks and salesmen's autos, Aug. 1, '40 to July 31, '41.....	\$ 4,500	\$ —
Mar. 31	Fire insurance on new building during construction, Mar. 31, '41 to July 31, '41.....	7,500	—
Apr. 5	Additional premium on fire insurance (new building), due to increased valuation, Apr. 15, '41 to July 31, '41.....	250	—
Apr. 15	Payment by Fidelity Insurance Company, reimbursement for loss, R. Jones, Oct. 25, '40.....	—	900
July 1	Premium on fire-insurance policy (building), Aug. 1, '41 to July 31, '42, covering new building and increased valuation of old building.....	1,500	—
Aug. 1	Premium on fire-insurance policy on stock of goods, period Aug. 1, '41 to July 31, '42.....	1,400	—
Aug. 1	Premiums on employees' fidelity bonds, Aug. 1, '41 to July 31, '42.....	3,000	—
Dec. 15	Defalcation of P. Smith to be reimbursed by Fidelity Insurance Company in 1942..	2,000	—
Dec. 31	Transfer to profit and loss to close out account.....	—	19,250
		<u>\$20,150</u>	<u>\$20,150</u>

NOTE—Premium on liability insurance on trucks and autos, period Aug. 1, '41 to July 31, '42, amount \$4,500, had not been paid or recorded.

## No. 5

Flint, Durant, and Nash are partners in a wholesale business. On January 1, 1941, the total capital was \$48,000 divided as follows: Flint, \$10,000; Durant, \$8,000; Nash, \$30,000. Their 1941 drawings were \$6,000, \$4,000, and \$2,000 respectively. Through the failure of debtors they lose heavily and are compelled to liquidate. After exhausting the partnership assets, including those arising from an operating profit of \$7,200 in 1941, they still owe

\$8,400 to creditors on December 31, 1941. Flint has no personal assets but the others are well off.

Prepare:

- Computation of partnership's liquidating loss.
- Statement of partnership's liquidation.
- Profit and loss and partners' accounts, closed out after liquidation.

## Solution to Problem 1

*Y Furnace Company*  
*Working Papers—Reorganization Adjustments*  
*Date*

Assets	Balance Sheet Date	Adjustments		Balance Sheet Reorganized Company
		Debit	Credit	
Cash.....	\$ 5,000.00		(5)\$ 500.00	\$ 4,500.00
Receivable.....	500.00			500.00
Inventory.....	5,500.00	(3)\$ 5,000.00		10,500.00
Plant and equipment, less depreciation....	55,000.00	(3)135,000.00		190,000.00
	<u>\$ 66,000.00</u>			<u>\$205,500.00</u>
<i>Liabilities</i>				
Accounts payable.....	\$ 2,000.00			\$ 2,000.00
X Iron and Coal Co.—note payable.....	215,000.00	(1)180,000.00		35,000.00
Capital stock—\$100 per share.....	100,000.00	(2)100,000.00		
Deficit.....	251,000.00		(4)\$251,000.00	
	<u>\$ 66,000.00</u>			
Paid-in surplus.....		(5)500.00	(3)65,000.00	68,500.00
Capital stock—\$25 per share.....		(4)251,000.00	(2)75,000.00	
			(1)180,000.00	
			(2)25,000.00	100,000.00
			(3)75,000.00	
				<u>\$205,500.00</u>

*Key to Adjustments*

- To record cancellation of notes payable to X Iron and Coal Co.
- To record exchange of \$100.00 shares for \$25 shares.
- To record the issuance of 3,000 shares of \$25.00 stock for plant, equipment and inventory.
- To close deficit account to paid-in surplus.
- To record payment of taxes and legal fees.

*Y Furnace Company*  
*Balance Sheet Giving Effect to Proposed Reorganization*  
*Date*

Assets	
Cash.....	\$ 4,500.00
Receivables.....	500.00
Inventory.....	10,500.00
Plant and equipment, less depreciation.....	190,000.00
<i>Total assets</i> .....	<u>\$205,500.00</u>
Liabilities	
Accounts payable.....	\$ 2,000.00
Z Iron and Coal Company of Delaware successor to X Iron and Coal Company, a Virginia corporation—note payable.....	35,000.00

Capital stock—4,000 shares par value \$25 per share.....		100,000.00
Paid-in surplus:		
Cancellation of note payable by X Iron and Coal Company.....	\$180,000.00	
Excess of par value of 1,000 shares of \$100.00 stock over the par value of 1,000 shares of \$25.00 stock.....	75,000.00	
Premium on sale of 3,000 shares of stock.....	65,000.00	
	<u>\$320,000.00</u>	
Less operating deficit and reorganization expenses absorbed.....	251,500.00	68,500.00
<i>Total liabilities</i> .....		<u>\$205,500.00</u>

*X Iron and Coal Company and Z Iron and Coal Company  
Working Papers—Reorganization Adjustments  
Date*

	<i>X Iron and Coal Company</i>	<i>Adjustments</i>	<i>Z Iron and Coal Company</i>
		<i>Debit</i>	<i>Credit</i>
Cash.....	\$ 46,000.00	(4)\$ 2,000.00	\$ 43,500.00
Receivables.....	5,500.00	(3)500.00	5,500.00
Inventory.....	5,000.00	(1)5,000.00	
Y Furnace Co.			
Stock.....	1.00	(1)\$140,000.00	140,001.00
Demand note.....	35,000.00		35,000.00
Marketable securities.....	881,000.00		881,000.00
Plant and equipment, less depreciation..	135,000.00	(1)135,000.00	
	<u>\$1,107,501.00</u>		<u>\$1,105,001.00</u>
Accounts payable.....	\$ 10,000.00		\$ 10,000.00
Capital stock—\$100 per share.....	950,000.00	(2)950,000.00	
Surplus.....	147,501.00	(4)2,000.00 (3)500.00	145,001.00
	<u>\$1,107,501.00</u>		
Capital stock—Z Iron and Coal Co.— par \$100.....		(2)950,000.00	950,000.00
			<u>\$1,105,001.00</u>

*Key to Adjustments*

- (1) To record acquisition of 3,000 shares of Y Furnace Co.'s \$25.00 stock.
- (2) To set up capital stock account of Z Iron and Coal Co.
- (3) To record payment of legal fees and taxes for the X Co.
- (4) To record payment of legal fees and taxes for the Z Company.

*The Z Iron and Coal Company (A Delaware Corporation)  
(Successor to the X Iron and Coal Company a Virginia Corporation)\*  
Balance Sheet Giving Effect to Proposed Reorganization  
Date*

<i>Assets</i>	
Cash.....	\$ 43,500.00
Receivables.....	5,500.00
Y Furnace Company:	
Stock—4,000 shares.....	140,001.00
Demand note.....	35,000.00
Marketable securities.....	881,000.00
<i>Total assets</i> .....	<u>\$1,105,001.00</u>
<i>Liabilities</i>	
Accounts payable.....	\$ 10,000.00
Capital stock, par value \$100.00 per share. 10,000 shares authorized of which 9,500 shares are outstanding.....	950,000.00
Earned surplus of predecessor corporation, The X Iron and Coal Company.....	\$147,001.00
Less taxes and legal expenses of The Z Iron and Coal Company.....	2,000.00
<i>Total liabilities</i> .....	<u>\$1,105,001.00</u>

NOTE:—The legal status of the earned surplus account will depend upon the laws of the State of Delaware. From an accounting point of view it seems clear that the earned surplus of the X Company should be regarded as earned surplus of the Z company.

# Solution to Problem 2

The Sandford Manufacturing Company (In Receivership)  
Working Papers—Receivers' Realization, Liquidation and Operations  
April 28, 1941 to November 20, 1941

Trial balance April 28, 1941		Receivers' cash transactions		Other transactions and adjustments		Realization Profit and Loss	Operating Profit and Loss	Balance Sheet
Debit	Credit	Debit	Credit	Debit	Credit			
Cash.....	\$ 800.00	(1) \$303,800.00	(2) \$170,400.00					\$134,200.00
Receivables.....	1,400.00	(1) 1,000.00						400.00
Finished goods.....	100,000.00				(3) \$ 40,000.00		\$60,000.00	
Materials and supplies.....	15,000.00				(3) 6,000.00		9,000.00	
Goods on consignment (out).....	220,000.00				(5) 220,000.00			
Employees' bonds.....	4,700.00				(6) 4,700.00			
Unexpired insurance.....	800.00	(1) 100.00				\$ 700.00		
Machinery and equipment.....	507,300.00	(1) 200,000.00			(10) 7,300.00			\$113,000.00
Accounts payable.....	\$110,000.00			\$ 7,000.00	(7) 30,000.00			1,000.00
Bank overdraft.....	1,000.00				(4) 10,000.00			105,000.00
Bank loans.....	105,000.00			(5) 220,000.00				30,000.00
Smith and Co.....	250,000.00							23,000.00
Acceptances.....	23,000.00			(6) 4,700.00				
Collateral notes payable.....	4,700.00			(7) 30,000.00				
Lease—machinery.....	30,000.00							
Accrued interest on lease.....	2,000.00			(10) 7,300.00				
City taxes accrued.....	1,000.00	(2) 4,000.00						
Mortgage interest.....	100,000.00	(2) 100,000.00						
Accrued interest on mortgage.....	3,000.00	(2) 3,000.00						
Reserve for depreciation.....	7,300.00							100,000.00
Capital stock—preferred.....	100,000.00	(1) 500.00						100,000.00
Capital stock—common.....	100,000.00	(1) 1,000.00		(4) 10,000.00				1,500.00
Surplus.....	10,000.00							
	<u>\$850,000.00</u>		<u>\$850,000.00</u>					
Sales.....		(1) \$ 75,000.00					\$75,000.00	
Rent of portion of building.....		(1) 1,000.00					1,000.00	
Interest on bank account.....		(1) 200.00					200.00	
Bulk sale of goods and supplies.....		(1) 25,000.00		(3) \$ 46,000.00		\$ 21,000.00		
Interest on city taxes during receivership.....								
Interest on mortgage during receivership.....		(2) 400.00					400.00	
Labor, materials, etc.....		(2) 2,000.00					2,000.00	
Gain on liquidation of lease liability.....		(2) 61,000.00					61,000.00	
Lapsed claims.....					(7) 2,000.00			
Bad debts.....					(8) 7,000.00			
Reserve for doubtful accounts.....					(9) 400.00			\$ 400.00
					(9) 400.00			
Realization loss.....								
Net loss on operations.....								
		\$474,200.00	\$474,200.00	\$327,400.00	\$327,400.00	\$283,100.00		\$283,100.00
						\$56,200.00		\$56,200.00
								\$473,900.00

## Key to Entries

- (1) To record cash receipts
- (2) To record cash disbursements
- (3) To record cost of bulk sale of goods and materials
- (4) To record liability not on books
- (5) To apply merchandise on outward consignment against advances by Smith & Co.
- (6) To apply employees' bonds against collateral notes payable.
- (7) To record liquidation of lease liability and accrued interest.
- (8) To record lapsed claims
- (9) To set up reserve for doubtful accounts receivable.
- (10) To close reserve for depreciation.





## Solution to Problem 3

	Present Basis	Revised Basis
(a) Cost of goods sold		
Raw materials inventory, January 1, 1941	\$ 53,000.00	\$ 40,000.00
Purchases	400,000.00	400,000.00
	<u>\$453,000.00</u>	<u>\$440,000.00</u>
Less raw materials inventory, December 31, 1941	22,500.00	22,500.00
Total cost of raw materials used (20,000 tons)	\$430,500.00	\$417,500.00
Other manufacturing costs	169,500.00	169,500.00
Cost of goods manufactured	\$600,000.00	\$587,000.00
Finished goods inventory, January 1, 1941	38,000.00	37,500.00
	<u>\$638,000.00</u>	<u>\$624,500.00</u>
Finished goods inventory, December 31, 1941	36,000.00	35,220.00
Cost of goods sold	<u>\$602,000.00</u>	<u>\$589,280.00</u>
Balance sheet accounts		
Inventory:		
Raw materials	\$ 22,500.00	\$ 22,500.00
Finished goods	36,000.00	35,220.00
Surplus:		
Decrease		\$ 780.00
(b) Dr. Adjustment of opening inventory of raw material (P & L)	\$ 13,000.00	
Dr. Adjustment of opening inventory of finished goods (P & L)	500.00	
Cr. Finished goods inventory 12/31/41		\$ 780.00
Cr. Cost of goods sold		12,720.00

## NOTES

- (1) The amount of "other manufacturing costs" is calculated as follows:

Materials used	20,000 tons	
Shrinkage	5,000 tons	
	<u>15,000 tons</u>	
Finished product		
Total cost at \$40.00 per ton (\$36,000.00 ÷ 900)		\$600,000.00
Cost of raw materials		<u>430,500.00</u>
Other manufacturing costs		<u>\$169,500.00</u>

- (2) The ending inventory on the revised basis is calculated as follows:

Unit cost of goods manufactured (\$587,000.00 ÷ 15,000)	\$ 39.13 $\frac{1}{3}$
900 tons at \$39.13 $\frac{1}{3}$	\$ 35,220.00

NOTE: The \$400.00 of accounts receivable reported as a loss are, in the opinion of the receiver, doubtful of collection.  
 NOTE B: Claims amounting to \$7,000.00 have lapsed and of the balance of accounts payable claims amounting to \$5,000.00 are in dispute. (It is assumed that the time for filing claims has passed).

## Solution to Problem 4

Date 1940	Description	Distribution of Insurance Charge and Credits				Other Accounts	Debit	Credit
		Insurance Expense 1940	Unexpired Insurance 12/31/40	Insurance Expense 1941	Unexpired Insurance 12/31/41			
July 1	Premium on fire insurance (building) 8/1/40 to 7/31/42	\$ 500.00	\$1,900.00	\$1,200.00	\$ 700.00			
Aug. 15	Premium on fire insurance (stock) 8/1/40 to 7/31/41	750.00	1,050.00	1,050.00				
Sept. 1	Premium on employees' fidelity bonds, 8/1/40 to 7/31/41	1,250.00	1,750.00	1,750.00				
Oct. 25	Shortage of R. Jones						\$ 900.00	
Dec. 1	Refund due to reduction in rate on buildings 12/1/40 to 7/31/42	*10.00	*190.00	*120.00	*70.00	Claim against Insurance Co.		
1941								
Feb. 8	Premium on liability insurance, trucks, etc. 8/1/40 to 7/31/41	1,875.00	2,625.00	2,625.00		Building under construction	7,500.00	
Mar. 31	Premium on liability insurance, new building under construction 3/31/41 to 7/31/41					Building under construction	250.00	\$ 900.00
Apr. 5	Additional premium on fire insurance (new building) 4/15/41 to 7/31/41			625.00	875.00	Claim against Insurance Co.		
Apr. 15	Payment by insurance company—R. Jones shortage			583.33	816.67			
July 1	Premium on fire insurance (building) 8/1/41 to 7/31/42			1,250.00	1,750.00			
Aug. 1	Premium on fire insurance (stock) 8/1/41 to 7/31/42							
Aug. 1	Premium on employees' fidelity bonds 8/1/41 to 7/31/42							
Dec. 15	Defalcation of P. Smith						2,000.00	
Dec. 31	Premium on liability insurance, trucks etc. 8/1/41 to 7/31/42			1,875.00	2,625.00	Claim against Insurance Co.		
		\$4,365.00	\$7,135.00	\$10,838.33	\$6,696.67	Accounts payable		4,500.00

\* Red

(b) The correcting journal entry is as follows:

Building under construction.....	\$7,750.00
Claim against Insurance Co.....	2,000.00
Unexpired insurance, December 31, 1941.....	6,696.67
Correction of 1940 insurance expense (P. & L.).....	
Insurance expense—1941.....	83,535.00
Accounts payable.....	8,411.67
	4,500.00

## Solution to Problem 5

(a) <i>Computation of Partnership's Liquidating Loss</i>				
Partnership capital, January 1, 1941 .....				\$48,000.00
Less drawings in 1941 .....				<u>12,000.00</u>
				\$36,000.00
Add operating profit .....				<u>7,200.00</u>
				\$43,200.00
Capital before liquidation .....				<u>8,400.00</u>
Deficiency to creditors following liquidation .....				
Liquidating loss .....				<u>\$51,600.00</u>
(b) <i>Statement of Partnership's Liquidation</i>				
Net assets before liquidation .....				\$43,200.00
Less liquidating loss .....				<u>51,600.00</u>
				\$ 8,400.00
Deficiency to creditors .....				<u>16,200.00</u>
Contribution by Durant .....				
Final distribution to Nash .....				<u>\$ 7,800.00</u>
(c) <i>Flint, Durant and Nash Statement of Partner's Accounts</i>				
	<i>FLINT</i>	<i>DURANT</i>	<i>NASH</i>	<i>TOTAL</i>
Capital, January 1, 1941 .....	\$10,000.00	\$ 8,000.00	\$30,000.00	\$48,000.00
Less drawings in 1941 .....	<u>6,000.00</u>	<u>4,000.00</u>	<u>2,000.00</u>	<u>12,000.00</u>
	\$ 4,000.00	\$ 4,000.00	\$28,000.00	\$36,000.00
Add operating profit .....	<u>2,400.00</u>	<u>2,400.00</u>	<u>2,400.00</u>	<u>7,200.00</u>
	\$ 6,400.00	\$ 6,400.00	\$30,400.00	\$43,200.00
Less liquidating loss .....	<u>\$17,200.00</u>	<u>\$17,200.00</u>	<u>\$17,200.00</u>	<u>\$51,600.00</u>
	\$10,800.00	\$10,800.00	\$13,200.00	\$34,800.00
Balances .....	<u>*\$10,800.00</u>	<u>*\$10,800.00</u>	<u>\$13,200.00</u>	<u>*\$ 8,400.00</u>
Deficit of Flint absorbed by Durant and Nash .....	10,800.00	5,400.00	5,400.00	
		*\$16,200.00	\$ 7,800.00	*\$ 8,400.00
Contribution by Durant .....		<u>16,200.00</u>		<u>16,200.00</u>
			\$ 7,800.00	7,800.00
Distribution to Nash .....			<u>7,800.00</u>	<u>7,800.00</u>

\* Red.

## BOOK REVIEWS

*Production, Employment and Productivity in 59 Industries.* Harry Magdoff, Irving H. Siegel and Milton B. Davis. (Philadelphia: W.P.A. National Research Project, 1939, Parts I, II and III.)

A sizable portion of the W.P.A.—National Research Project's work consists of analyses of "Production, Employment and Productivity," in various industries. These studies are, for the most part, based on primary data heretofore unavailable and an important part of this information is contained in the 3 volumes here reviewed. These volumes present a valuable collection of indices on "Production, Employment and Productivity."

The data for the production indices are based, for 48 of the 59 industries and 11 of the 13 groups, on the output figures contained in the Census of Manufactures. (Some of the separate industries are combined into groups and the groups are analyzed as a whole. There are 13 of these groups.) The data for the remaining indices were taken from the reports of various governmental agencies and, on occasion a trade association report was relied upon. Since the Census of Manufactures is taken only in odd numbered years, extensive interpolation is required.

The basic source of employment (number of wage-earners employed) data was also the biennial Census of Manufactures, with interpolations for even-numbered years. The employment data, for a large number of industries, were converted into man-hours of employment. This was done, mainly by "multiplication of the employment indices by relatives of weekly hours and division of the resulting products by 100."

The productivity index, for a given industry is derived by dividing the production index by the index of man-hours (or of employment where a man-hour index could not be constructed). Since both the production and employment series are confined to the period 1919-36 (or in some cases a sub-period of these years) the productivity indices are of necessity confined to the same period. Due attention is paid to the numerous and knotty problems of making the production and employment series comparable.

The authors are to be complimented on their care in constructing these indices and on their awareness of the difficulties of securing indices, both of production and of employment, which are independent of the weights which they choose. However, their care in choosing weights merely serves to emphasize the slovenly manner in which they define the productivity concept.

From the point of view of economic theory, the concept of productivity used in this study is without meaning. An index of production is divided by an index of employment and the quotient is called an index of labor productivity. The authors are, of course, free to call it that if they like, but the index does not give the information one might expect, judging from its title. The authors might just as well have constructed an index of plant and equipment employed in production, used it

as a divisor of the production index, thereby obtaining an index of "capital" productivity. How much of the output can be attributed to labor and how much to plant and/or equipment, is a question that cannot be answered with such rudimentary techniques as are used in this study. This line of argument may be somewhat unfair since the authors do not ask these questions, but the indices are not very much more successful in answering the questions for which they are devised.

The indices are supposed to answer such questions as "how much employment would there be if we again attained the production levels of 1929?"—or "how much production is necessary in order to employ the same number of wage earners as were employed in 1929?" In order to answer such questions we should need to know, not the index of labor productivity at the actual level of output, but the index of labor productivity (or its reciprocal, the index of unit labor requirements) for the 1929 output. To assume that the unit labor requirements for one level of output (in a given industry) are the same as they are for some other level of output is to assume, implicitly, that there is a state of constant physical returns to labor within the industry as a whole, i.e. that the efficiency of labor is not related (over the relevant range of outputs) to the quantity of labor employed. Such an assumption, however, is completely at variance with the empirical results which the authors obtain. A large number of their series shows a higher unit labor requirement for later dates than they do for earlier dates which implies either that there was technological "regress" or that there was a state of "increasing return" to labor. It is possible, of course, that technical progress might result in more labor being required at low levels of output, i.e. the new processes are more efficient than the old only for large outputs. However, this is likely to be the case only at very low levels of output and is, for the most part, irrelevant here.

Since it is extremely unlikely that there is ever technological "regress," we may infer the existence of "increasing returns."<sup>1</sup> It is noteworthy that in the preface, the director of the study, David Weintraub, admits "that changes in the degree of plant capacity utilization are known to affect labor productivity," but states that "the observed trend in labor productivity reflects principally the effects of continuous changes in industrial techniques on the amount of labor required per unit of output." While Dr. Weintraub's judgment is certainly deserving of the most profound respect, the reviewer wishes that he (Weintraub) had developed

<sup>1</sup> The concept of increasing returns, as used in this review, does not have the precise meaning given it in economic theory. The reviewer is using the term to denote situations where increases in the output of an industry lead to decreases in the unit labor requirements when the production function of every firm in the industry is unchanged. Shifts in the distribution of output from less to more efficient firms as the industry's output expanded would cause, on this definition, increasing returns to the industry, even though there were constant returns, in the theoretical sense, to each firm.



some technique for measuring the relative effects of changes in the degree of "plant capacity utilization" and of technological progress on the unit labor requirement index.

That there is much confusion on the meaning of productivity indices of this sort, even among good economists, is attested to by the fact that, within the past two years, two able economists have used indices of the sort presented in these books, for conflicting purposes. Hans Staehle, in "Employment in Relation to Technical Progress" (*Review of Economic Statistics*, May, 1940, pp. 94-100) sought to measure technological progress by means of the variations in a labor productivity index, while H. M. Oliver, Jr., in "The Relationship Between Total Output and Man-Hour Output in American Manufacturing Industry" (*The Quarterly Journal of Economics*, February, 1941, pp. 239-254) sought to measure variations in "returns" by the variations in such an index. This state of affairs is discouraging, to say the least.

Despite these rather carping criticisms, the reviewer is highly sympathetic with the objectives of this study. The effect of technological advance on the number of employment opportunities was in the pre-war, and probably will be in the post-war, world a problem of tremendous importance. The authors have tried to measure the effect of technological advance on the volume of labor required to produce various outputs. In this ambitious task, they have done valuable pioneer work, and for this, all who are interested in such knowledge, are greatly in their debt.

M. W. REDER

Bryn Mawr College

*Economic Analysis*. Kenneth E. Boulding. (New York: Harper and Brothers, 1941. Pp. xxxiv, 796. \$4.25.)

The creation of a satisfactory text and the systematization of the body of economic analysis is what Professor Boulding sets out to accomplish. Boulding is writing in the tradition of Alfred Marshall. How far he succeeds and how far he falls short, in the reviewer's opinion, can best be stated by taking certain general aspects of the book rather than by a meticulous examination of particular topics of which the 796 pages of this book is full.

The statements of economic methodology in Chapter 1 are excellent. Professor Boulding points out the relationships between fact and theory, and in a few paragraphs indicates the abstract character of economic propositions. This whetted the appetite for something really good to follow, for an exposition which would make beginning students in economics realize, as they almost never do, that economic theory shows but one side of a phenomenon, that economic theory can be most useful if rightly understood, but that it is never the whole story about any given phenomenon. In other words, I hoped for something in accord with the methodological principles enunciated in the introduction to Pareto's *Manuel*. This expectation of a true perspective on economic analysis was not fulfilled; the body of the text with its problems used to illustrate theory, seldom presents the limitations of such analyses. Problems used

to illustrate a theoretical analysis seem to me the best pedagogy; but economists, like lawyers, are too prone to state the limitations of their particular logic and then go ahead as though their logic gave the answer to any particular problem. The beginning of the first course in economics is the place to teach the future economist scientific humility. My first regret in reading this book was, therefore, that Professor Boulding did not follow throughout the insight shown in his first chapter.

The preponderant emphasis of the book is on the equilibrium of particular prices rather than on general equilibrium of the whole economy: "The major task of economic analysis is to explain why the price of butter is thirty cents per pound and, of course, why all prices, wages, incomes, interest rates, and other economic quantities are what they are" [page 8; see also page 38]. Before going far in the book, any student should be able to employ this type of analysis with considerable skill, for in this objective Professor Boulding does succeed. He nevertheless slights some of the great developments in economic theory by overemphasis on particular equilibrium analysis. Those paragraphs in the text which mention general equilibrium analysis and the few paragraphs in the appendix to Chapter 34 will certainly not give anyone unfamiliar with the concept of general equilibrium an inkling of what it is about.

Professor Boulding attempts in Part I to give an overall picture of economic principles and of economic phenomena with an analysis based on supply and demand concepts. In this first part the chapters and the topics discussed seem to tumble one after another in helter-skelter fashion. Each is interesting, for the author can write to tickle the student's interest. Sentences such as the following should be a delight to undergraduates: "There is something about the increase in the purchases of hair oil resulting from falling in love which differs from the increase in purchases resulting from a fall in the price of hair oil" [page 54]. Clever use of paradoxical statements are also frequent and make the reading more interesting; but fine finishings cannot remedy a poorly planned development. The beginning student may find it very perplexing to follow the ideas and concepts as they are presented here. In other words, the building materials are assembled; they are of excellent quality; and the workman has done a good job; but the services of an architect were needed.

The five chapters on money, capital, banking, international economic relations, and applications of monetary theory, that is, the chapters dealing with monetary theory, attempt to cover everything from the functions of metallic money, international trade, the gold standard, to price indices, central banking theory, and cycle theory. Once again, much of this is excellent, but it attempts, unwisely I believe, to preserve the manner of presentation customary in older texts, and generally lacks that care in presentation which such a wide variety of topics requires. This section belies the author's statement in the preface that he did not aim to be encyclopedic. In this as in other places the impression is given of a very good series of classroom notes compounded into a text to which has been added many explanations of business and financial terms and descriptions of particular economic institutions.

The second part of the book is, on the whole, much superior to the first although probably too difficult for first-year students. The theory of the firm and of the industry under perfect competition, monopoly, and imperfect competition has been well stated and will, I believe, be an excellent basis for advanced classroom discussion. This is the part which will appeal to the educated reader who wants to know something of the more recent developments in the economic theory of individual firm costs and of the supply curves for an industry. For such people Professor Boulding has written some eminently worthwhile chapters.

As final critical comments I should like to point out two additional shortcomings of the book considered as a definitive text. First, it should have given more emphasis to that 20th century economic problem, the widely fluctuating level of employment. Unemployment may be with us again some day, and a book on economic analysis ought to have considerable to say about it. In this respect Meade's book, *An Introduction to Economic Analysis and Policy*, leads the way. Second, such a text might well include sections on the recent discussion of the theory of centralized control of industry, that is, something of the debate over the economic merits of socialism and capitalism so well presented by Professors Pigou and Lange.

Although this review has been mainly critical, I must express my admiration for the scholarship displayed in this book. It is an interesting adventure exploring pathways to that higher general level of economic understanding which we all seek, and as such it rates a worthy place among the pioneers.

RICHARD BERNHARD

Bureau of the Budget  
Washington, D. C.

*Commercial Credit and Collection Practice.* Watrous H. Irons. (New York: Ronald Press Company, 1942. Pp. xxi, 559. \$3.50.)

To any one who has been engaged in credit practice or has taught the subject at the collegiate level, it is immediately apparent that credit is not a science or subject unto itself. Early writers of credit books, groping their way, compounded economics, business English, accounting, statement analysis, and phases of business law with established tenets of credit and collection practice, finally evolving a fairly satisfactory text. The established pattern of writing books on mercantile and retail credit has been to begin with an introduction, mostly economic, of the importance of credit, then to classify it, and call attention to the various types of credit instruments. This, the beginning section, was usually followed by an academic analysis of the credit risk and the credit manager, developing the principles behind the credit trinity of "C"—"character," "capacity" and "capital." The third and most important part of the book consisted of an exposition of the sources of credit information, with special attention to the agencies collecting and disseminating credit information for a fee, namely the General Mercantile Agency, Retail Credit Bureaus, and the Interchange system of the National Association. The next section presented the mechanics

of the credit office and the control of credit, followed by a final section on collection or the redemption of credit.

Dr. Irons has not departed radically from the above established pattern but he has recognized the need for more concrete illustrations and examples in deducing the credit risk and in reaching a credit decision. Good case material has been the crying need in credit instruction. Unless the instructor had had actual credit granting experience, he could do little more than make his course one of pure factual exposition. The students finished the course perhaps knowing more about the general operation of credit machinery but they were not prepared to meet credit problems by "sham battle" methods. Dr. Irons has tried to meet this deficiency by working into his text many analytical chapters with problem material. For example, after several chapters on the analysis of financial statements, a concluding chapter, "Financial Analysis: An Illustrative Case," is presented. In this chapter he attempts to put into practice the principles and theory developed before, by showing how to prepare and analyze data and reach a conclusion. As another illustration of the emphasis upon analysis, Chapter 17 is given over to "The General Mercantile Agency; Dun and Bradstreet, Inc." Immediately following is one titled "Analysis of Dun and Bradstreet, Inc. Reports; An Illustrative Case." These examples are but two of many that are to be found throughout the book.

The merit of Dr. Irons' book lies not so much in the slight recasting of the conventional pattern of presentation as in telling the student in lucid language more of the "how" of credit granting. One has the feeling after reading through the text that Dr. Irons had in mind both the academic and business student, and was not "writing up" to his colleagues in the teaching profession.

DANIEL D. GAGE

School of Business Administration  
University of Oregon

*Modern Corporation Finance.* William H. Husband and James C. Dockeray. (Chicago: Richard D. Irwin, Inc., 1942. Pp. viii, 837. \$4.25.)

This is a most satisfactory and complete book on corporation finance. Although not unorthodox it has certain strong qualities stemming from the authors' wide acquaintance and wise use of the latest studies pertaining to business and government.

The work is replete with timely, interesting, and appropriate illustrations which are carefully integrated into the discussion. The legal approach to corporation finance is given thorough treatment and many cases are cited and discussed. Statistical studies are used widely to support conclusions.

Rather than attempt to present the pattern of the book or to list the table of contents, a few chapters which impressed this writer may be noted. *Executives and Their Compensation* (Ch. 27), seems to be a real contribution. The discussion will do much to familiarize the student with a subject which is frequently bitterly discoursed upon but about which little is known of the over-all picture. The various methods of compensation are explained and the abuses noted.

Another outstanding chapter (Ch. 22) relates to the

securities exchanges. The treatment is complete and impressive, and the function of the exchanges is incisively summarized in sentences such as the following: "While the exchanges are seldom . . . used directly to raise funds for corporations, they do exert great influence upon the channels through which funds flow. They function like a traffic signal, indicating a green light when certain fields offer the necessary inducement to attract capital and blazing a red light when the outlook for new investment is not attractive." Much light is thrown on the relation of the S.E.C. to the stock exchanges. Other chapters that deserve commendation are: *Sources of Capital* (Ch. 18), *Dividends and Dividend Policies* (Ch. 25), and *Taxation and Public Policy* (Ch. 38).

What is the underlying philosophy of the authors? It may be said at the outset that little economic theory is woven into the book. Although much is said about the corporation and its social responsibility this writer does not get a clear picture of the authors' fundamental views on economics. The book is favorable to the "reforms" of the last decade and seems to echo the growing belief that much of the friction between business and government is based more on personal grounds and customary beliefs than on sound principles. Their philosophy seems to be that regulation should (among other things) be directed toward eliminating barriers to competition rather than regulating monopolies as they increasingly appear; it is even hinted (p. 224) that corporations might need to justify their existence before a charter is granted. To this writer the most important factor in maintaining competition is freedom of entry into the various fields. Consistent with the authors' general philosophy is the emphasis on a shortage of venture capital (p. 352) rather than on a dearth of profit opportunities.

The faculty of the authors for clarity strongly commends this book as a text. Its completeness reduces the need for supplementary reading and students will find it most readable. The thinking is definitely liberal.

ALLEN B. EDWARDS

University of Virginia

*Principles of Punch-Card Machine Operation.* How to operate punch-card tabulating and alphabetic accounting machines. Harry Pelle Hartkemeier. (New York: Thomas Y. Crowell Co., 1942. Pp. iv, 269. \$3.25.)

Dr. Hartkemeier's book is divided into four parts: (1) a brief resume of the history and need for punch-card machines, (2) a description of the operation of numerical tabulating machines, (3) the operation of the alphabetic accounting machines, and (4) methods of obtaining sums of squares and products. Numerous illustrations and problem material are provided, and the loose-leaf presentation enables student and teacher to reorder the material in any desired manner. The subtitle, "How to operate punch-card tabulating and alphabetic accounting machines" is, however, more accurate than the title which would lead one to expect an emphasis on "principles." The book is confined almost entirely to a discussion of tabulating and accounting machines,

other items such as punches, sorters, verifiers, as well as more highly specialized equipment are, for the most part, ignored. As a training manual for machine operators the book is excellent, but it is doubtful that the book succeeds in its major objective.

The evolution and expansion of punched-card equipment has been so rapid that its true place in the educational field is not yet clearly understood, states the author in his preface. "For example, many people still confuse the proper study of the fundamentals of the subject with the mere training of machine operators. This is a serious error and is partially responsible for the failure of the teaching profession to give sufficient attention to this development. The business executive need not develop speed or proficiency in the use of the machines themselves but he can hardly be considered competent to take charge of modern statistical and accounting records unless he is familiar with these machines and their uses." The purpose of the book thus seems to be to develop the principles and fundamentals of machine operation, but it is difficult to reconcile this statement of purpose with long descriptions of the wiring of plugboards and the use of digit selectors. Critical discussion of the use and limitations of the machines is lacking. Even the obvious volume limitations surrounding the use of the machines are not mentioned. Where a simple distribution and continuous use are present, other devices such as keysort cards or, perhaps, the use of an IBM service agency as substitutes for machine installations are available. But competing services and competing equipment, such as Remington-Powers machines, are not mentioned. The book is confined to a discussion of IBM equipment. "Since it [IBM equipment] is operated by electricity rather than by any mechanical means, flexibility is an inherent feature of this electric tabulating machine" (p. 7). Is this a causal statement? It seems dogmatic since no attempt is made at comparison and justification. In many processes Remington equipment is both faster and more flexible than IBM's.

The subtle and important limitations implied in the philosophy underlying the accounts draw no breath in these pages, although perplexingly present at every step in the machine process. Where general-purpose statements are prepared, the machines may be worse than useless. The wise accountant, at least in a large organization, will recognize that such statements can have only limited value as answer-givers but can be very useful in suggesting questions to the executive, questions of detail which can only be answered by resort to the books. The same process in machine accounting leads back to the cards where the information can be obtained only by long, tedious, and forbidding work. Even in special-purpose statements the same limitations are present in greater or less degree.

The book suffers further from a lack of critical discussion of techniques. The use of sampling verifications, and other time-and-money savers receive no mention although undoubtedly of interest to accountant and executive. The problem of planning the flow of work is omitted, and the same fate is meted out to the problems revolving around the efficient designing of cards—strange omissions in a book devoted to "fundamentals."

Some day, perhaps, a study will be made on the psychological effects of punched-card machines. The esthetics of the machine, the whirling noises and fluttering cards, with the neatly ordered columns of figures as the end-product, seem to have a fatal attraction for the human mind. Many an office or shop is cluttered with machines busily engaged in turning out reports that could just as effectively and even more quickly be done by the use of adding machines or comptometers.

WILLIAM COOPER

Washington, D. C.

*Business Statistics.* Martin A. Brumbaugh and Lester S. Kellogg. (Chicago: Richard D. Irwin, Inc., 1941. Pp. xxx, 913. \$4.00.)

Textbooks in the field of statistics may be grouped into three categories based on the level of mathematical knowledge which the authors presuppose their readers have attained. At one extreme are texts designed for students whose knowledge of mathematics is limited to elementary algebra. At the opposite end of the scale are those which make the calculus a prerequisite for the intelligent reader. In between fall a number of widely used standard textbooks that demand something more than elementary algebra as a foundation. In *Business Statistics* the authors have sought to reach an audience on the first of these three levels of instruction. They have written for the benefit of students whose natural interest and training make it unlikely that they will become practitioners in the use of advanced statistical methods. As the authors state in their preface "those few who are conducting advanced research work have little need for this book." Instead they seek the "consumers" of statistics plus that very large proportion of the "producers" of statistics who "either now or in the future contemplate engaging in the usual type of statistical collection, analysis, and presentation carried on within business concerns, statistical organizations, and government agencies."

The text material covering close to nine hundred pages carries through in a consistent manner the aim which the authors set forth in the preface. Complicated derivations of formulas are avoided and the techniques are generously illustrated by examples that have an extremely practical ring. It is one of the characteristics of the book as a whole that the authors seem not only to be keenly aware of the elementary student's need but also to have a real appreciation of the sort of problems that confront the business statistician.

The arrangement of the text material follows a logical pattern. The first fourteen chapters of the book deal very largely with the collection, editing and tabulation of data together with simple graphic and ratio methods of analysis. This emphasis upon the basic processes seems timely in the face of the present great demand for statistical workers. A large proportion of those who go by the name "statistician" both in industry and in government seldom are required to do more than construct tables and charts and compute simple averages and ratios.

Chapters IX and X which deal with library sources of data fill a very real need. The general inability of college students to employ the resources of the library intelligently stands as a major criticism of our educa-

tional processes. Courses in statistics must assume a very large share of the responsibility for giving instruction and providing the practice necessary to enable students to use profitably the library facilities at their command. All chapters are accompanied with problems and exercises and those which are given to provide practice in the use of library sources of data seem particularly well chosen.

A number of minor limitations of the text might be mentioned. In an effort to include within the scope of an elementary text at least some discussion of the more technical analytical procedures the authors have been forced to treat them in a superficial manner. Any well-rounded and adequate discussion of such techniques as the t-test, analysis of variance and Chi-square would have taken the authors beyond the limits of an elementary treatise. It is easy to appreciate the horns of the dilemma with which they were confronted even though in the reviewer's judgment the treatment of these important topics should either have been made adequate or omitted altogether.

Chapter XXVI is really a case study in production planning. Its inclusion leaves the reader in doubt as to whether it was intended to illustrate a time series analysis or to make time series incidental to the management problem of production planning. In any case the contents of this chapter, interesting as they are, appear as part of a principle of organization that is foreign to the rest of the text. Here the problem seems to take precedence over the techniques while the material for the other chapters has been organized around the methods.

The order of presentation could have been improved in a few places. The chapters dealing with library sources should precede rather than follow those dealing with the collection of data from direct sources. Since Chi-square is a test of significance the section dealing with it seems misplaced. It really belongs in the chapter that deals specifically with tests of significance. The organization of the material on index numbers is a little confusing because quantity indexes are treated in two places, parts of Chapters XIX-XX and then again in Chapter XXV. This difficulty arose out of the author's attempt to discuss index numbers of volume before time series had been treated.

The points of criticism that have here been raised are very minor blemishes and detract little from the merits of this excellently written text. The book definitely bears the earmarks of experienced teachers of the subject. They have written a text which beginning students of statistics will not only comprehend but enjoy.

R. PARKER EASTWOOD

Columbia University

*Inventory Valuation and Periodic Income.* Carl Thomas Devine. (New York: The Ronald Press Company, 1942. Pp. xii, 191. \$3.00.)

A number of factors, among which may be enumerated widely fluctuating price levels, higher taxes, and a growing interest in the development of some consistent body of accounting principles to replace the old thumb-rules which have governed accounting procedure, have recently aroused much interest in the question of inventory valuation and its effect upon the income statement. This book is therefore timely in that it brings



together in a scholarly manner a great deal of material that previously has been widely scattered.

The author has limited his study to an investigation of the effects which various methods of inventory valuation have on the reported income stream. No attempt is made to cover methods of counting, recording, or auditing inventories. No new methods are proposed and the author is not an advocate of any one inventory valuation method. His contribution is instead a clear statement of the assumptions which underlie existing methods and an unbiased presentation of the general results which can be expected from each of these methods.

In a study of this type the author first had to determine how the desirability and validity of a given principle or convention could be tested. He has at the outset discarded the "democratic rule of awarding the decision to the proposal enjoying the widest use" as likely to lead to uncritical acceptance of conventions which need to be changed and he recognizes the futility of comparison against some so-called "true" standard. Instead three bases of testing have been set up:

- (1) "an attempt is made to determine the possible consequences of each course of action.
- (2) "an estimate of the probable reactions of those reading accounting reports is made.
- (3) "The desirability of the probable reactions is tested by reference to certain broad social standards taken from the general fields of business administration, economics, sociology, and psychology."

The first chapter of the book is devoted to a general survey of the concepts of income and cost as these terms are used by the accountant and by the economist. In comparing these two viewpoints, the author points out that the economist is primarily interested in distribution of the national income whereas the accountant looks at the problem from the opposite side, that is, from that of an individual unit producing a small portion of this income. The difference between the economist's traditional classification of income shares and the classification found on an accounting income statement could have been made clearer by emphasizing that the above difference in objective naturally leads to a difference in the way costs are classified. Thus, the businessman finds it useful to know how much he has spent for power, for raw materials, for direct labor, etc., because the market in which he buys classifies the factors of production in this way and not as land, labor, and capital. Most units of the various production factors purchased by an entrepreneur are inextricable combinations of land, labor, and capital and hence the statement that "the techniques for a plausible breakdown of the bookkeeping figure are not particularly difficult" (p. 10) must be doubted. Furthermore, it should not be forgotten that the accountant records only costs which call for monetary outlays by his firm and thus he omits entirely from his reckoning many important economic costs of production.

Chapter 2 points out that the inventory problem has two principal aspects, namely, the allocation of costs to periodic revenues and the classification of de-

ferred charges for balance-sheet display. The author rightly views the first of these aspects as distinctly more important than the second and, with the exception of a single chapter (chapter 3), the book is devoted to a consideration of problems in income determination.

The general standard applied for testing inventory methods is stated as follows: "He (the accountant) should estimate as closely as possible the amount of benefits which may reasonably be expected and should attempt to burden the periodic revenues with a share of the cost which corresponds to the proportional amount of expected benefits which were utilized in securing the recognized volume of revenues. While this procedure may be used as a standard by which various methods are tested, it is obvious that in practice various rules of convenience must be devised and utilized in the actual distribution of costs" (p. 13). The remainder of the book is given to a detailed examination of these rules of convenience which the accountant has devised for inventory valuation.

Chapter 5 takes up identified cost and its approximations. The basic theory underlying the identified cost method is stated to be an analogy with the method for determining ultimate profit or loss over the life of the firm. The physical unit of merchandise is the unit for calculation of gain or loss; the summation of the costs associated with the specific units disposed of is matched with the related revenues and the result taken as profit or loss for the period. Various assumptions for determining identified cost (viz., first-in, first-out, average cost, and standard cost) are described together with the characteristic results associated with each. That management may have considerable leeway to influence periodic income figures under the identified cost method is a point well taken.

The principal objection which can be raised to identified cost as a basis for income valuation is that it fails to reflect changes in market value which apply to inventory units that are yet unsold. Chapters 6 and 7 accordingly examine methods which have been devised for reflecting in the income account such changes in value of unsold goods. After marshalling the generally familiar arguments pro and con for replacement costs and for cost or market, whichever is lower, the author concludes that

"The importance of replacement costs to the management cannot be denied; neither can the usefulness of prices for alternative goods which were never purchased be completely dismissed. The question pertinent to this discussion is whether the replacement costs need be considered in arriving at enterprise *net income*, and an admission of the importance of current costs does not commit one to the defense of their use in determining periodic profit figures. In fact, it is not clear that these costs need to be brought into the double-entry system at all. Even in the balance sheet area, where their use is of unquestioned value, it is not necessary to place the account balances in terms of current costs—such figures may be reported as supplementary information" (pp. 68-69).

With respect to the lower-of-cost-or-market rule, the author concludes that

"Beneficial results will ordinarily result from separating the cost of goods sold figures into two elements:



that part which is associated with the expiration of the physical units and that portion which applies to the decreased possibilities of the remaining stocks" (p. 90).

There seems to be considerable merit in this suggestion and its application should serve to shed much light on net income where substantial charges are made to reduce inventories to levels below cost.

Chapters 8 on normal-stock methods constitutes a useful survey of the now voluminous literature on this subject.

Chapters 9 and 10 compare the previously described inventory methods by applying them to a specific set of figures from the operations of a cotton processing firm over the years 1933-38. This illustration is perhaps most valuable in that it makes evident the difficulty encountered in forming generalizations concerning the effect that the use of different inventory methods have on a firm's financial statements, for these effects vary greatly according to the character of the price changes, material purchases, and material usage which take place.

The remaining chapters of the book consider inventory-valuation problems that arise in special situations where the usual matching of costs and revenues breaks down either because cost of the type needed becomes indeterminable owing to the prevalence of joint costs or because the period of production is so long that it becomes desirable to give recognition to revenues before the goods leave the firm.

The reader of the book would have been aided by the addition of a short chapter presenting in summary form the conclusions drawn by the author from his study.

WALTER B. MCFARLAND

Arthur Andersen & Co.

*Audits and Examinations.* Christian Oehler. (New York: Fordham University Press, 1940. Pp. xxiv, 369. \$4.00.)

The objective of the author, as set forth in the preface, is to provide a textbook in "auditing and examination procedure," designed for students with a "solid foundation in accounting theory"; also to confine his book strictly to the question of *what to do and how*, and to omit any question of accounting theory, except such incidental reference as is necessary. The book is notably successful in fulfilling these objectives.

The manner of presentation deserves special mention, because the subject-matter follows the pattern of an experienced auditor in developing an audit program and procedure. The chapters are designed to correspond to the usual captions found on balance sheets and income statements; beginning each chapter are such definitions as appear to be necessary; next follows a general audit program for the account or accounts subject to audit verification; thereafter appear paragraph headings in large type, corresponding to the steps under the general audit program, and discussion of each step. Frequently a further breakdown of each step in the general audit program appears under the paragraph headings. This arrangement is easy to follow and eliminates the necessity of thumbing through an appendix to discover the answer to questions which the reader may have in mind.

There are other features of this book, which are not usually found in auditing texts. For example, a clear

distinction is drawn between the responsibilities of the client and the auditor for such matters as running down differences disclosed by the audit, e.g. as in subsidiary ledgers. Differences in audit procedures resulting from variations in type of records are discussed—a common situation the answer to which is not always apparent to a student in auditing. Likewise the author has attempted to explain what constitutes reasonable verification, and his illustrations have assumed the conflicts that arise in a typical audit examination. In this connection the author has been fairly successful in the use of the word "test-check" or "sampling" in that he has attempted to relate the term to conditions of internal control, and has made an effort to define a reasonable test-check. Considerable stress is placed on the importance of internal control in determining the scope of examination necessary. This subject is vitally important and is too often overlooked by the practitioner.

Throughout the author has injected simple devices or "tricks" which every experienced auditor knows and uses regularly, and which are great time-savers.

The reviewer can not subscribe to certain of the details in all of the recommended programs. This is particularly true of the program covering the verification of cash and cash transactions, which is unduly cumbersome. Following are three steps under this program, the reasons for which are not apparent in all particulars:

"3. Comparison of the checks paid by the bank during the month ended on the balance-sheet date with the bank statement and with the entries in the cashbook. Checks entered in the cashbook prior to the month ended on the balance-sheet date should be compared not only with the bank statement and with the entries in the cashbook, but also with the client's list of outstanding checks at the beginning of that month.

"4. Verification of the footings of the cashbook for the same period for which the paid checks were compared with the cashbook, e.i., the month ended on the balance-sheet date.

"5. Verification of the footings of the bank statement covering the month ended on the balance-sheet date."

A comparison of canceled checks with the bank statement can only serve to prove that all checks are on hand. A simple proof is a tape of all returned checks the aggregate amount of which should agree with the total bank charges as determined by considering the opening and closing bank balance and the total of deposits, as shown by the bank statement. No mention is made of obtaining bank statements and canceled checks directly from the bank, which would eliminate the necessity of taping the checks (often referred to as "proving" the bank statement).

In regard to point 4, the footing of the cashbook is not necessary if the checks are compared with the cashbook inasmuch as the proof of the footing is automatically performed when the total of bank charges adjusted by "open items" at the beginning and end of the period agrees with the total of the cashbook, as, of course, it should. There appears to be no reason for point 5.

The audit verification of property accounts and depreciation reserves is not discussed as thoroughly as the subject warrants, particularly when contrasted with the heavy emphasis placed on the verification of cash and

cash transactions. Too much stress is placed on the verification of the mechanical accuracy of accounts, books of original entry, and posting; and the importance of an overall approach for determination of reasonableness is not sufficiently covered.

The discussion of receivables, inventories, securities, deferred charges, liabilities, reserves, and nominal accounts is excellent and well balanced, and the material throughout is singularly practical and realistic.

E. L. SANDBERG

#### *Tennessee Valley Authority*

*Industrial Accounting.* Samuel Waldo Specthrie. (New York: Prentice-Hall, Inc. 1942. Pp. xi, 243. \$3.25.)

This volume is intended by the author to provide engineers, engineering students and business administrators with an "understanding of the processes and executive uses of industrial accounting." In recognition of the fact that many such persons would be undertaking the study of accounting *de novo* the author has devoted slightly less than the first half of the book to an exposition of basic accounting concepts and rudimentary bookkeeping procedures. This material is intended to provide a basis for the discussion of cost accounting that occupies the remainder of the book.

The book is characterized throughout by extreme brevity. The entire discussion occupies only 185 pages, supplemented by 53 pages of problem material of an appropriate degree of difficulty. This brevity has posed a difficult task for the author since a satisfactory discussion of such a large area of accounting is not easily reduced to such small compass. Moreover, it is the author's professed intention that the discussion of cost accounting be a full treatment and not merely a "survey or very elementary treatment." In view of the author's self-imposed page limitation he has done a rather good job. Necessarily, as a result of this brevity, the reader will encounter inadequacies or inaccuracies in some of the discussion but if the need for a condensed presentation be granted then the author's selection of included material and his presentation of this material is rather good.

On the other hand, the need for such extreme condensation is not wholly clear. It is obviously desirable in a book of this kind to minimize the discussion of elementary bookkeeping procedures but there is much in favor of a full discussion of the basic concepts or theoretical considerations which shape accounting practices or procedures and which are basic to a proper interpretation of the data produced by the cost-accounting process. However, the book is almost solely concerned with the method rather than the philosophy of cost accounting. Its brevity has meant that many technical aspects of cost accounting could only be partially explored.

The author closes the book with a statement that expresses his conception of the rationale that underlies much of the subject of industrial accounting. He states that while most of the charges to production are at "actual cost" yet in the main they are also charged at "current period prices" and the latter is the significant aspect of these charges. His conclusion from this is that the depreciation provision, the principal "non-current" charge, should be based on current replacement cost

so as to "adjust the costs to . . . current conditions." The author does not explore the shortcomings of such a practice nor does he indicate that it probably would be opposed at this time by the majority of accountants.

E. B. RICKARD

#### *Securities and Exchange Commission*

*Fundamentals of Accounting.* Perry Mason (Chicago: The Foundation Press, Inc., 1942. Pp. xv, 494. \$4.25)

Professor Mason's book is a worthy addition to the list of good elementary accounting textbooks. It is available in two forms: one with the "Problem Material" bound with the text, and the other with the "Problem Material" bound as a separate pamphlet.

One of the strongest features of the text, and of the questions and problems as well, is the very obvious effort made to build the materials of the book from actual and modern accounting practices in use. While this is not a new idea, the author has taken more than ordinary care in acquainting himself with the accounting practices and the office procedures of a wide variety of business enterprises. He has not only illustrated and described the uses of mechanical equipment but in addition has brought applications of their use into the practice set and problem materials.

In the opinion of the reviewer, the principal objection that may be leveled at the book is one that others may regard as an element of strength. The reviewer therefore raises it in the form of a question. Is the text material, including the illustrations, too difficult for the average college student on the freshman or sophomore levels? There is no doubt that the better students will learn a great deal of accounting theory and practice from a study of this text, much more in fact, than from the study of many other elementary texts. There is, however, some doubt that the average student without preliminary bookkeeping training, will be able to understand the technical and difficult illustrations. In one of the initial illustrations beginning on page 32 the author introduces accounts for Contracts Payable and Federal Old Age Benefit Tax Payable. On page 37 he lays the basis for the considerable emphasis given to cost accounting. Here, accounting for production is introduced and accounts for Work in Process and Accrued Payroll are discussed. The emphasis given to cost accounting makes it necessary to introduce many accounts used in production accounting early in the course.

Chapter 14, "The Place of Accounting in the Social Order," deserves particular mention. Here the author discusses the relationship between accounting and economics, accounting and the law, and accounting and government.

Chapter 28, "The Field of Accounting," is appropriately placed at the end of the text material, for when the student reaches this point he has acquired sufficient knowledge of accounting to understand and appreciate its fields of usefulness.

This book is more than just another elementary textbook. It will appeal particularly to those interested in striving for a high level of scholarship in the work of their students.

HARVEY G. MEYER

*University of Tennessee*

# ASSOCIATION NOTES

ROBERT L. DIXON

## NEW MEMBERS

The following have become regular members of the Association since July 1, 1942:

NAME	PROFESSIONAL CONNECTION	NOMINATED BY
Sister Alexine Beatty	Regis College	P. J. Fitzpatrick
Jesús Lista Blanco	Colegio de las Ursulinas and Colegio Teresiano	Orlando Lopez-Hidalgo
G. A. Brennan	Winton, Riquardt & Smith	R. L. Dixon
Fred R. Dahlberg		R. L. Dixon
A. E. Freeze	Office of Price Administration	C. A. Phillips
C. T. Hiller	U. S. Treasury Department	C. A. Phillips
R. W. King	Office of Price Administration	F. P. Smith
W. C. Luffman	Private practice	R. L. Dixon
L. D. MacKay	Office of Price Administration	M. L. Black, Jr.
R. Pelegrí	Private practice	R. L. Dixon
J. D. Peoples	Private practice	R. L. Dixon
E. P. Smith	University of Pennsylvania	G. A. MacFarland
R. M. Trueblood	U. S. Navy Cost Inspection	R. L. Dixon

## PERSONAL NOTES

*Burl Austin* (University of Iowa) recently received an Iowa C.P.A. certificate and has left the University of Iowa to enter public practice.

*Harold B. Baker* (Butler University) is on leave of absence to serve as State Price Economist for Indiana in the Bureau of Labor Statistics.

*R. D. M. Bauer* (University of Missouri) and *P. H. Darby* (Kemper Military School) are joint authors of *An Outline of Elementary Accounting*.

*Norbert G. Bausch* (University of Nebraska) has recently received a Nebraska C.P.A. certificate.

*John G. Blocker* (University of Kansas) is author of a recently published survey text entitled *Essentials of Cost Accounting*.

*Wm. F. Crum* (University of Wichita) is now a Private in Company B, 1st Finance Training Battalion, Ft. Harrison, Indiana.

*Raymond Einhorn* (Mississippi State College) has resigned to accept the position of Associate Cost Accountant with Office of Price Administration in Washington, D. C.

*Harold B. Eversole* (University of Iowa) has been granted a leave of absence to accept appointment as Assistant Regional Accountant in the Chicago office of Office of Price Administration.

*Robert L. Kane, Jr.* (Boston University) has been ordered to active duty with the U.S.N.R. (Supply Corps).

*Jerome J. Kesselman* (University of Kansas) is now a Private in the U. S. Army and has been assigned to the Medical Corps, stationed at Camp Robinson, Arkansas.

*Edwin W. Lightfoot* (University of Puerto

Rico) is now a Lieutenant (j.g.) U.S.N.R. on active duty at Headquarters, 10th Naval District, San Juan, Puerto Rico.

*Stewart Y. McMullen* (Northwestern University) taught at the Harvard Graduate School of Business during the summer session.

*Perry Mason* (University of California) has accepted appointment as Regional Accountant with Office of Price Administration in San Francisco. He is the author of the recently published *Fundamentals of Accounting*.

*Gilbert Maynard* (University of Iowa) has left the staff to work for Office of Price Administration. He recently received an Iowa C.P.A. certificate.

*Lloyd F. Morrison* (University of Michigan) was visiting instructor in accounting at the University of Missouri during the summer session.

*Arthur E. Nilsson* (Oberlin College) has been on the teaching staff of the Harvard Graduate School of Business during the summer and also is Consultant on the staff of Office of Price Administration in Boston.

*Leo A. Schmidt* (Marquette University) has accepted an appointment to the staff of Harvard Graduate School of Business.

*William H. Shannon* (University of Kansas) is now a Lieutenant in the U. S. Navy Bureau of Supplies and Accounts, stationed at Miami, Florida.

*Harry M. Stewart* (Kansas State College) has received a Kansas C.P.A. certificate.

*Paul C. Taylor* (Tulane University) has been nominated a national director of the N.A.C.A.

*Frederick W. Woodbridge* (University of Southern California) is President of the Los Angeles Chapter of N.A.C.A.

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Topic—Limitations on Profit. Theories and Methods of Imposing Restrictions on Private Profit—The Tax Burden—Contract Renegotiation. Representatives of both government and business will be the speakers.

*Second Session—Tuesday, December 29, 2:30 P.M.*

Chairman—(Open)

Topic—Current Educational Problems. A discussion of the questions arising out of the effect of the war on the student body, the teaching staff, and the curricula.

*Third Session—Tuesday, December 29, 6:30 P.M.*

Annual Dinner.

*Fourth Session—Wednesday, December 30, 9:30 A.M.*

Chairman—Henry T. Chamberlain, Loyola University.

Topic—Cost Problems. Ascertainment of costs under war contracts—Cost principles—Cost-Audit procedures of the war agencies.

*Fifth Session—Wednesday, December 30, 2:30 P.M.*

Chairman—Frank P. Smith, Co-director of Research, American Accounting Association.

Topic—Accounting Principles. Effect of latest Statement of Principles by the Executive Committee of the American Accounting Association—Recent Developments and Trends.

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